SEP 28 1942

ENGINEERING NEWS-RECORD

SEPTEMBER 24, 1942

THE "SEABEES" ARE COMING

How the Navy's new battalions of construction men are being conditioned and trained to build bases abroad.

See page 45

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THE SCRAP SITUATION IS SERIOUS. Waste materials—scrap metals, rubber and all the rest—are needed for war. For example, it takes roughly a half-ton of scrap steel and a half-ton of pig iron to make a ton of new steel for vital fighting equipment.

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Collecting scrap materials is a job that will need *your* help as long as the war lasts. See that all worn-out or obsolete tools and equipment, old pipe, structurals and other useless materials are turned over to the scrap dealer promptly. Urge your business associates to turn in their scrap as fast as it can be collected. (All scrap steel will be purchased by the steel industry at the government-controlled price.) Also encourage your employees to turn over to a local salvage committee, charity or junk dealer all their old rubber and discarded metal household equipment.

No quantity of scrap is too small to be salvaged. Every pound turned in will help relieve the continuing shortage. Help shorten the war and save American lives by turning in your scrap. Do your part now and for the duration. The Armco Drainage Products Assn., 865 Curtis St., Middletown, Ohio.

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This advertisement is in support of the Salvage Program of the Conservation Division of the War Production Board.

ENGINEERING NEWS-RECORD

Devoted to Buildings, Sewers, Waterworks, Bridges, Roads, Dams, Foundations, Earthwork, Flood Control, Public Works, Shipbuilding, Irrigation, Canals, Railroads

McGRAW-HILL PUBLISHING COMPANY, INC.

Publication Office: 99-129 North Broadway, Albany, N. Y. • Editorial and Executive Offices: 330 West 42nd Street, New York

JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

Vol. 129 SEPTEMBER 24, 1942 No. 13

COMING NEXT

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• Liberal quantities of sweat combined with engineering legerdemain is making possible the installation of new water supply facilities in the Hampton Roads area. The strategy and tactics of this campaign to telescope the work of years into a few months, despite shortages of material and equipment, may be usefully applied elsewhere.

• Curtailment of new road building and shortages in steel have had a wide effect on highway department operations. What these effects are and how they are being met will be told in the first of a series of interviews with state highway engineers. Outstanding are the use of unreinforced concrete for paving highways and the wide use of timber in highway bridge construction.

• • •

WAR BUILDINGS OF 1942

• Much has happened in the building field during the past 12 months that is significant to the war effort, new factories, office buildings, military and naval structures have multiplied as never before. And in the face of material shortages and demands for speed, the design job has required ability and ingenuity. A cross section of results of this effort is scheduled for the Oct. 22 issue. A special section on "War Buildings of 1942" will portray many of the outstanding structures that have made the present year one of the most notable on record.

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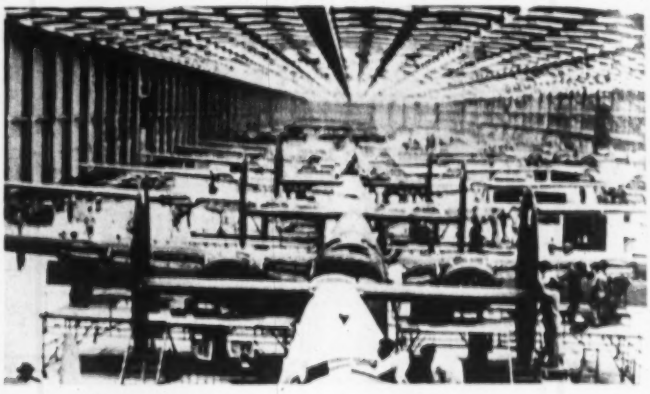
Right under your feet... there's a new source of light — YOUR FLOOR

IF YOUR FLOORS ARE WHITE, YOUR PLANT GETS MORE LIGHT

WAR PRODUCTION SPEEDED BY GIANT NEW LIGHT REFLECTOR

Floor that reflects light increases efficiency and reduces accidents



• *White cement floors on which Consolidated Aircraft Corporation is assembling B-24 bombers. The white cement surface throws 61% more light to the under side of bomber wings and fuselages, and 20% more light on vertical surfaces than does grey cement surface in adjacent areas in same plant. Designed and built by The Austin Company.*

LIGHT-REFLECTING FLOORS, made with Atlas White cement, are acting today as giant reflectors and diffusers of light in essential war plants. They chase shadows from production and assembly lines. They reflect much more light to the under side and vertical faces of work. They help employees operate with greater speed and safety . . . avoid errors and spoilage of materials. They sharpen the vision of workers who have defective sight . . . of older men and of new workers who are working at a machine for the first time.

White cement floors in aircraft plants for Boeing, Consolidated, Douglas and North American are showing their superiority over darker floors. Look into them, either for new buildings or as retopping for old floors. In installations already made they have repaid their initial cost quickly. They can be cleaned and kept white simply and economically.

In factories, food plants, warehouses, hangars, hospitals, offices, apartments—in corridors, basements, stair wells—wherever increased production, material conservation, extra lighting, sanitation and safety are important, it will pay to get LIGHT FROM FLOORS.

Write for a new book, "LIGHT FROM FLOORS." It tells about the advantages of better illumination and gives detailed information on the construction, maintenance and value of light-reflecting floors made with Atlas White cement. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

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ENR-F-4

LIGHT-REFLECTING FLOORS

MADE WITH ATLAS WHITE CEMENT

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • SEPTEMBER 24, 1942 • VOLUME 129 • NUMBER 13

Concentrate postwar highway planning on urban areas

PRA lines up $35,000,000 in work for immediate postwar start, is prepared to approve half-billion more. Majority of projects stress clearing urban traffic snarls

Road construction projects costing about $35,000,000 will be ready to go after the war as a result of advance-engineering projects so far approved by the Public Roads Administration as joint federal-state undertakings. PRA is prepared to approve postwar projects that might run to a half-billion dollars.

Last year's highway act authorized a federal contribution to the states of $10,000,000—to be matched equally with state funds—to carry out now the design work on major road projects to be built after the war. The money is allotted to the states according to the standard federal-aid formula.

So far, design projects costing about $1,750,000 have been approved, involving a federal contribution of $876,313. As the states become familiar with the plan and the pressure of access road jobs eases, applications are coming in faster.

In line with the original intention of the scheme, the approved projects run heavily to major projects intended to ease the flow of traffic through and around cities. Engineering work is now underway on such projects in San Francisco, Washington, Boston, Kansas City, St. Louis, New York, and the New Jersey metropolitan area.

One of the biggest jobs is California's. It provides for a 42-mile extension of the Bayshore Freeway from the San Francisco-Oakland Bay ridge along the west shore of the bay through San Jose.

In Washington, D. C., an express road running from the center of the city to join Route 1 to Baltimore is being designed, as is an extension of the Rock Creek Parkway system. The Massachusetts highway department is making studies of 24 miles of road to complete an existing by-pass northwest of Boston. The Kansas City project involves location and design of about 20.5 miles of street to provide two east-west and one north-south route through the city.

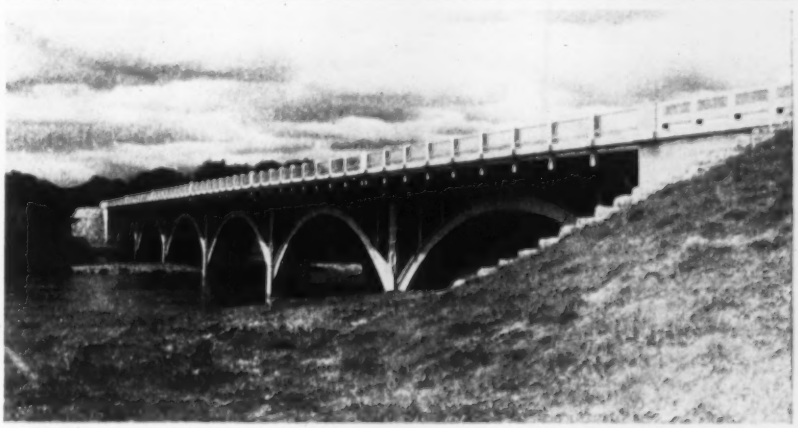
At St. Louis, two long by-pass projects are being designed—a 26.5-mile road to the North of the city and a 20.5-mile one to the South. In addition, the projects include 3.2 miles of roadway to complete the east-west route through the city and 1.5 miles of construction to ease the flow of incoming traffic from the West.

The New Jersey project is a 36-mile express highway from the end of the George Washington Bridge southwest to the Raritan River.

New York State is working on two major jobs. New York City has programmed a 14-mile express highway extending the Hutchinson River Parkway and Eastern Boulevard in the Bronx to meet Connecticut's Merritt Parkway. Upstate, a 28.5-mile express highway midway between Albany and Schenectady will serve as a by-pass for both cities. Also under study is a 2.2-mile express connection between Brooklyn and Queens.

PRA policy on approval of projects undertaken with the $10,000,000 of design money requires that in every case there be an express understanding that the actual construction will not be started until after the war. Moreover, the design work must result in putting the project into such shape that it can be got under construction very quickly when the time comes.

Preference is given to projects serving urban traffic, and any rural projects approved must be such as to fit into a future system of inter-regional highways. The general outlines of such a system were laid out two years ago by the PRA in its "Toll Roads and Free Roads" report.



Open new bridge over Colorado River

The 659-ft. concrete-arch Lamar St. bridge, crossing the Colorado river to provide a by-pass system for part of the heavy automobile traffic passing through Austin, capital of Texas, and to serve as a relief for the city's only other north-south river crossing, recently was opened to traffic.

The grade line of the new bridge was placed about 20 ft. lower than that of the other structure—the Congress Ave. bridge, about a half-mile downstream, on the assumption that the floods on the Colorado River would be controlled by the operation of the Marshall Ford Dam. As built, the bridge is designed to carry about 150,000 cu.ft. per sec., about one-third of the maximum flood in 1935.

The structure has 42 ft. of roadway, including two center lanes of 11 ft., two outside lanes of 10 ft., and two sidewalks of 3½ ft. It consists of six spans which are open spandrel arches with a clear span of 105 ft., providing a rise of 19 ft. Arch rings were built as segments of circles with different radii to give increased strength at the haunches. Pier and abutment footings were carried into hard limestone material.

WASHINGTON HIGHLIGHTS

The Army Engineers moved this week to carry out the improvement of the Gulf Intra-Coastal waterway which was authorized by Congress this summer. A request went to the Hill for authority to use existing funds to enlarge the waterway from Apalachee Bay, Florida, to Corpus Christi, Texas. The work will take about a year, will cost $6,485,000.

Presentation of the request indicates strongly that no action will be taken to build the Florida barge canal. The canal was authorized in the same law as the improvement of the waterway, but no move is being made to get money for it. Oil barges operating on the improved Intra-Coastal will feed oil to the trans-Florida pipeline now being built by the Defense Plant Corp.

THE War Production Board has taken over from the Army and Navy all authority over priorities. Construction projects, therefore, may no longer be given project ratings by military officials. Procedure on construction of facilities to be owned by the Army or Navy is to submit to WPB an application for a P-19-h rating on form PD-200; the form must be countersigned by the Army and Navy Munitions Board. All other construction projects are rated by the WPB alone.

CONTRACTORS building airplane, naval, and military establishments are entitled to buy standard typewriters under a revision of the typewriter rationing restrictions. Previously this privilege was limited to contractors building munitions plants.

MANUFACTURERS' prices of cement are controlled by OPA Price Regulation 224. For sales in the normal marketing area of a mill, the ceiling price set is the highest price received March 1-15 plus any freight rate increases since March 17. In order to facilitate flow of cement into areas where there is a shortage, the regulation establishes definite prices, f.o.b. mill, for cement sold to war jobs outside the usual marketing area of the mill. This permits addition of transportation charges to the price. Prices are set for each of the twelve Bureau of Mines districts, based generally on 95 percent of average 1941 net mill realization on sales by mills in that district.

CONSTRUCTION has begun on the first war housing project in the vicinity of the Ford Willow Run bomber plant and contracts have been awarded on two others with work scheduled to start immediately. (*ENR* Sept. 3, p. 321.) Work is underway at Ypsilanti, Mich., on 3,000 dormitory units which will be made available for single workers at the bomber factory, biggest in the world.

Contracts have been let for 1,900 permanent family dwelling units in two groups, one of 900 and the other of 1000, at Wayne, Mich.

Press Association Photo

Warehouse collapses under apparent overload

This old four-story brick warehouse at 1055-59 St. Louis Ave., Kansas City, Mo., collapsed recently under an apparent overload of groceries and other merchandise.

Owned by the Liberty Storage Co. of Kansas City, the building's collapse sent an avalanche of brick and masonry over a railroad car on a siding, overturning the car and burying it almost completely. One workman was injured as a result of the accident.

Exact cause has not been determined, pending full examination by the owner and by engineers of the city building inspector's office.

The accident was very similar to the collapse of another old warehouse, near Milwaukee, Wis., which collapsed August 10, killing 12 workmen. The Milwaukee building, constructed in 1910 at a time when no building code existed, also collapsed under an apparent overload of thousands of cases of empty bottles, stored there by a brewing company. Engineers working under the direction of the Milwaukee district attorney's office are now investigating into that accident.

Form collapse kills two at Chicago engine plant

Failure of a center wall form in a divided drop forge foundation pit at the Dodge engine plant now under construction in Chicago killed two carpenters and badly injured a third Sept. 18.

The form, 16 ft. wide and 20 ft. high, kicked-out at the bottom during concrete pouring. The men were trapped by the form wreckage and smothered in a flow of fresh concrete.

Because of the wreckage of reinforcing and form lumber, and the initial setting of the concrete while the bodies were being recovered, the exact cause of the collapse is not known. The form was substantially built, held by double 4x4 in. wales and braced back to the end of the pit by struts.

First reports of a huge explositn and building collapse brought half the city's police and fire force to the scene.

WPB cuts off production of metal doors and frames

Production of metal doors, metal door frames and metal shutters for military or civilian use has been prohibited by War Production Board Limitation Order L-142.

Previously, manufacture of these products for civilian use had been controlled by the denial of preference rating applications for metal, except for essential uses. The new order halts all production except for fire doors meeting certain maximum specifications, and for airplane hangar doors.

Manufacturers are permitted to fill orders received prior to the issuance of the order, provided that the door, frame or shutter is intended for a rated building or project already under contract, and provided that the door, frame or shutter can be completed in 45 days. Manufacture of doors, frames or shutters on an A-10 or higher rating for repair and maintenance purposes is also permitted by the order.

Shutters covered by the order refer to means of closure in the side, floor, ceiling or partition of a building, shaft or tower, but not to windows or window shutters, which are covered by another order.

In 1941 the WPB said that 120,000 tons of steel were consumed in production of these products.

Blanket approval permits planned by WPB for miscellaneous building

Order permits application for priority on routine repair and maintenance jobs of less than $5,000. Number of forms required to be filled out now reduced.

Operators of industrial plants, office buildings, apartment houses, hotels and other substantial buildings were recently granted permission by the War Production Board to apply for blanket authorization covering miscellaneous construction work over a period not to exceed six months.

This order makes it possible for both the operators and WPB to avoid handling numerous applications for construction jobs, necessary in larger buildings, but which, under the former plan, had to receive individual authorization when the cost for all such work reached the limit set in the stop-construction order, L-41. (*ENR*, April 16, p. 577).

Under the new plan, all routine individual construction jobs, except those estimated to cost more than $5,000, may be included in applications for blanket authorization. In cases where authorization is granted, the applicant must file within two weeks after the expiration of each period of the term of the authorization a report covering the work done, its cost and materials consumed. Form PD-200 should be used for all such applications and reports. (See below).

In making the report on the work done, the applicant must mark it "Report on blanket construction" and include with the report a letter indicating the serial number and date on which the application was approved. The application should, if possible, set forth the proposed construction work within the stated period of time in terms of jobs, dollars and quantities and material. A separate application must be submitted for each separate building or project. Where it is impossible for the application to forecast the proposed job accurately, an application of more general nature will be considered, but the total cost of the proposed construction and the preliminary materials list must be included.

The plan is for blanket construction authorization only and does not alter the usual procedure for obtaining priorities assistance. However, when such assistance is required, this must be indicated on the blanket application.

New application form

A revised project application form, PD-200, to be used for obtaining priority assistance and authority to begin construction for most construction items and equipment is now available for use.

This form must now be used as an application for: authority to begin construction pursuant to the provisions of Order L-41; priority assistance for any project involving new construction, reconstruction, remodeling or conversion; priority assistance for equipment when construction is involved. PD-1A applications formerly submitted for such equipment will no longer be accepted.

Replacing dispossessed property

A method of expediting emergency applications to rebuild or replace property dispossessed because of acquisition for use by war agencies also has been announced. Although such applications for authorization to begin construction should be filed in the usual manner, government agencies in the field may now telegraph pertinent information to the construction bureau of WPB in New York, where a special staff has been organized. A considerable saving in time is effected, and in instances where applications are approved, telegraphic authorizations to begin construction are sent promptly to applicants.

It is necessary for the party dispossessed to receive a letter from the authorized officer representing the government agency concerned, identifying the property and establishing the fact that it has been acquired for war use. Quantities of all new materials involved in construction should be included on the application, and the cost in dollars.

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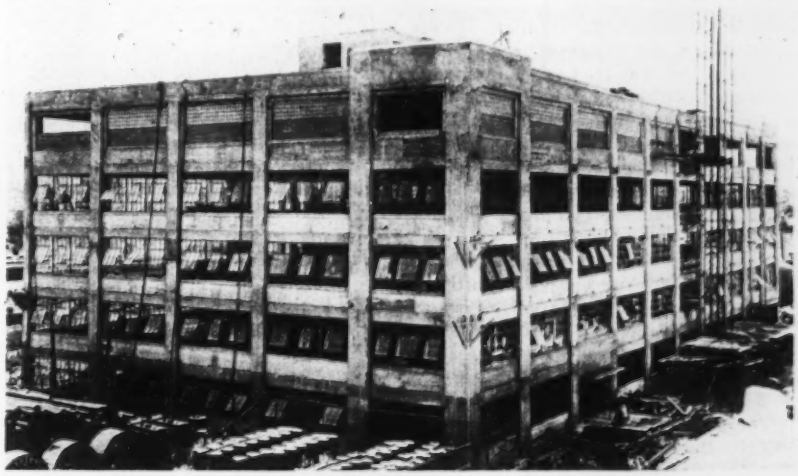
Private builders start 105,987 homes in 1942

Construction of 105,987 new houses was started during the first eight months of 1942 by private builders operating under the FHA war housing program, according to Federal Housing Commissioner Abner H. Ferguson.



Daylighting featured in war manufacturing plant

Abundant, well-distributed daylight to meet lighting needs in manufacturing precision instruments, is incorporated in a reinforced-concrete frame building now nearing completion in New York City for the Kollsman Instrument Div., Square D Co. Installed on the air-conditioned top floor, the daylighting employs exterior panels of glass blocks and white ceilings to achieve a uniform, glare-free, natural lighting over the entire floor. An almost continuous ribbon of glass blocks extends from sill height nearly to the ceiling.

The blocks have built-in prisms that turn and redirect the light rays passing through the walls. The rays, thus, are projected upward to the ceiling, which reflects the light downward on the working surfaces.

The blocks also aid in eliminating infiltrated dust and dirt and reduce condensation and heat losses. The insulation characteristics of the block are expected to virtually eliminate condensation, permitting higher and more comfortable interior humidities during winter.

Considered an innovation in industrial plants is the auxiliary "blackout" ventilation system for the lower floors of the building. These areas, daylighted and ventilated by factory sash, are each equipped with two longitudinal air ducts fed by two 32-sq.ft. masonry shafts leading to roof blowers, to provide fresh air if blackouts require shutting the windows.

Designed by Square D engineers, the building provides a large amount of floor space, and was built in four and a half months under the supervision of Emil E. Knittel, supervising engineer. Industrial Engineering Co., New York, were the general contractors; Tiltz Air Conditioning Corp., New York, designed the air conditioning system. The Defense Plant Corp. financed the project.

Allocation of water supplies probable in order to meet industrial needs

Gorman of WPB tells New England Water Works Association that some areas face grave water shortages. Plant protection and chemical contamination possibilities outlined at 61st annual meeting.

Allocation of water in some parts of the country to assure a sufficient supply for industrial needs may become necessary in the near future, Arthur E. Gorman, chief of the water supply section, War Production Board, told the New England Water Works Association meeting in Boston last week.

Originally scheduled as a four-day convention to be held in Poland Springs, Maine, the meeting was stripped down to a two-day gathering without exhibits and featured a program devoted entirely to wartime waterworks problems.

Mr. Gorman stated that water might be classified as a basic critical material, the shortage of which in some areas threatens to curtail industrial production. Deficiencies in rainfall, lowering of groundwater levels and inadequacies of supply and treatment facilities already have called for stringent conservation measures and may lead to the institution of some form of allocation of supplies.

He urged municipal waterworks officials to cooperate fully with all industrial users and made a plea that no applications be made for priority ratings on materials unless they were absolutely needed.

"The WPB water supply section," said he, "is charged with the responsibility of procuring maximum returns from minimum use of materials, and this objective can be reached only by viewing the needs of the nation as a whole."

This was Mr. Gorman's first public appearance since his appointment to the WPB water supply post two months ago. He is on leave of absence from the city of Chicago where he is assistant city engineer in charge of the water purification division.

Army advice on guarding

Primary responsibility for guarding water supply facilities falls on the municipality or agency owning the system, said Col. Lewis E. Moore of the First Service Command Headquarters, Boston, who gave some practical pointers on safeguarding property.

A single guard, he pointed out, is of dubious value since he might easily be disposed of; but two men, within sight of each other at frequent intervals are four times as effective as a single watchman. Fences alone do not offer sufficient protection, and they should be considered simply as a means for reducing the number of required guards.

It is imperative, he pointed out, that the guards can depend on reinforcements should need arise, the most logical source of help being the local police department. Thus it would be wise to institute a system whereby the plant would report by telephone to the police, or other central place, every hour on the hour. Furthermore, these telephone reports should include some type of simple code identification that is changed at frequent intervals. "Do not," cautioned the speaker, "post the code on a bulletin board or alongside the telephone."

In regard to arms, guards should be equipped with nothing smaller than .25 calibre rifles and .38 calibre pistols; shotguns are of little value as a guard weapon.

Colonel Moore warned waterworks men not to accept the wearer of any Army uniform as free from suspicion until his identity has been checked, preferably through communication with Army headquarters.

At Portland, Maine, a guard system has been established, according to Fred J. Reny, director and general manager of the Portland Water District, at a cost of $500 monthly.

Poisoning water supplies

The possibility of poisoning reservoirs by broadcasting chemicals was discounted by Lazarus Rubin, senior chemist of the Massachusetts State Department of Public Health, who cited this example of quantities involved:

If it was desired to render water unfit for consumption in a 100,000,000 gallon reservoir, using a concentration of 100 ppm. of a soluble toxic substance, it would require about 83,000 lb. of a chemical agent. A lethal charge could be introduced in the water system if it were possible to concentrate the dosage near the reservoir outflow, but subsequent passage of the water through a filtration plant would greatly minimize toxicity.

Leon A. Bradley, head of the bacteriology department, Massachusetts State

South of the Border

Relatively few at the New England Water Works meeting were aware that the Dexter Brackett memorial award winner, Prof. Gordon M. Fair of Harvard, has just returned from a 15,000-mile field trip through Central and South America. As engineer-consultant of the division of health and sanitation, Office of Inter-American Affairs, of which Gen. George C. Dunham is director, he has been organizing cooperative public health work in Latin America. His traveling companion was Maj. Ernest W. Steel, U. S. Engineer Corps, formerly professor of sanitary and municipal engineering at Texas A and M College.

Herald-Traveler photo

Wartime waterworks problems occupy the attention of F. H. Kingsbury, retiring president, Harold L. Brigham, president-elect, of the New England Water Works Association; Maj. John H. Brewster, Sanitary Corps regional engineer, and Arthur E. Gorman, chief of the Water Supply Section, War Production Board.

College, pointed out that perhaps the greatest hazard to be overcome in chemical and bacterial warfare was the fear and panic created in the public mind. To cope with this, he urged that the public be informed how to handle and also avoid contaminating agents. To this end the Massachusetts State College has been training civilians in decontamination practice. Already 172 men and women representatives from municipalities throughout the state have received this specialist training, and they are ready to advise and aid their local civilian defense organization should the need arise.

Officers and awards

At the meeting, which was the 61st annual assembly of the association, Harold L. Brigham, superintendent, Water and Sewage Commission, Marlboro, Mass., was elected president, succeeding F. H. Kingsbury, senior sanitary engineer of the Massachusetts State Department of Public Health.

Karl R. Kennison, chief engineer of the Metropolitan District Water Supply Commission, Boston, took office as second vice president, and Frank J. Gifford, superintendent of water, Dedham, Mass., former secretary, was elected to the new post of secretary-treasurer.

Gordon M. Fair, professor of sanitary engineering, Harvard Graduate School of Engineering, received the Dexter Brackett memorial medal, awarded each year for the most meritorious paper presented to the association. Professor Fair's paper, selected from a group of fifty, dealt with hydraulic investigation of water distribution systems; it was published in the June, 1941, issue of the association's journal.

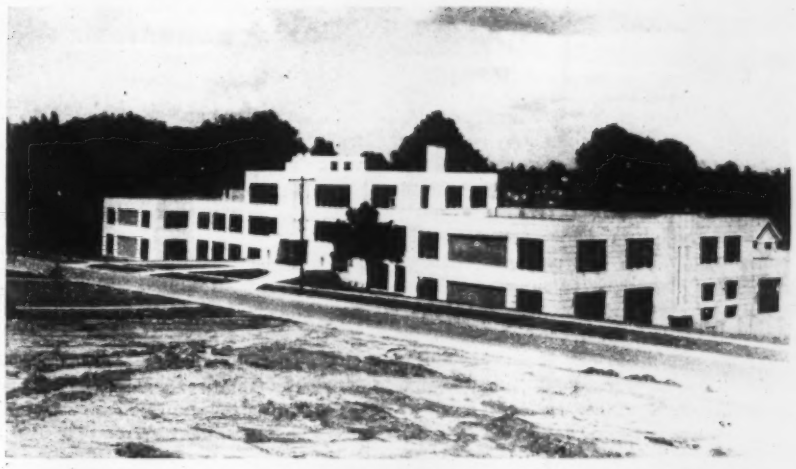
Registration at the meeting was 483. This compared with an attendance of 720 last year.

Exhibits by manufacturers were ruled out this year because of war conditions (last year there were 55 exhibitors). However, manufacturers held a place on the technical program during which spokesmen for representative industries conducted a symposium on priority ratings. Also presented was an illustrated lecture on repairs to broken pipes given by George R. Wahl, engineer, Transite Pipe Department, Johns-Manville, New York.

. . .

Marple appointed to Bonneville district post

Warren H. Marple, formerly assistant to the chief of the Bonneville Power Administration's Planning and Marketing division, has been appointed manager of the Lower Columbia district office at Portland, Ore.



Mississippi vocational school building completed

Providing 21 work shops to meet the need of in-school and out-of-school youth and adults, this new $200,000 vocational school was completed recently at Meridian, Miss.

A unit of the Meridian Junior College, the building provides 70,000 sq.ft. of floor space, and is built of monolithic concrete throughout. Fluorescent lighting is used to give proper lighting of work-tables.

Krouse & Brasfield, of Meridian, were architects for the structure, which was built with local labor.

AED sponsoring auxiliary unit for army engineers

At the request of the Corps of Engineers, the Associated Equipment Distributors is sponsoring an affiliated engineer unit to be composed largely of men from the ranks of the construction and construction equipment industries. This unit is being organized for heavy-duty maintenance and repair work, including major overhaul, rebuilding and reconditioning of all types of Engineer equipment such as tractors, angledozers, power shovels, air compressors, and pneumatic tools, and surveying instruments. Men from 18 to 45 are eligible, with pay ranging from $50 a month for privates to $138 per month for master sergeants.

Recruiting of personnel for this unit will be confined for the time being to the Second Service Command, covering New York, New Jersey and Delaware, and the Third Service Command covering Virginia, Pennsylvania and Maryland. The District of Columbia is also included in the recruiting area. The Recruiting Committee is composed of vice-president Ed P. Phillips of the AED as chairman, W. W. Bucher, James C. Alban, Sr., S. John Oechsle and S. Merill Bemiss. Applications must be submitted on "Application for Enlistment" forms and filled out completely. All applications should be mailed to: The Recruiting Committee, Associated Equipment Distributors, National Press Building, Washington, D. C. Enlistment will be for the duration of the war and six months thereafter. Applications may be obtained from the above office and from W. W. Bucher, c/o R. E. Brooks Co., 50 Church St., N. Y. C.

New York plans postwar reclamation of beach sites

The construction of a complete sewage disposal system and development of waterfront parks will provide postwar New York City with a waterfront dotted with miles of new beaches according to a report submitted by the city's park department on its postwar projects.

The city recently approved capital budget amendments for plans and specifications for a $628,000,000 postwar construction program (*ENR* Aug. 20, p. 263).

According to the park department's report, the sewage system in the postwar program, augmented by existing plants, will dispose of all sewage that now enters the waters surrounding the city, eliminating many areas in which it is now unsafe to swim. One of the largest waterfront improvements envisioned will be on the north shore of Jamaica Bay in the Borough of Brooklyn.

Other developments will include one at Little Bay on the north shore of Queens, and at Ferry Point Park in the Bronx, at Bronx Park, Flushing Meadow Park in Queens, improving a park on Ward's Island in the East River, and improvement of Alley Pond Park in Queens. Other new park areas are planned in Staten Island.

Complete purification of these waters awaits completion of adjacent sewage disposal plants. The Jamaica plant, now under construction, will be completed this year, and the 26th ward plant, near Canarsie, is under construction but probably cannot be completed until after the war. A third plant is to be built on Beach Channel near Rockaway.

Americans to complete hydro job in Uruguay

Completion of the Rio Negro hydroelectric project in Uruguay under the guidance of American engineers has been authorized by the government of Uruguay.

The project was begun before the outbreak of war by a syndicate of German engineers and manufacturers. When work stopped because of war, the dam was about 90 percent complete and the powerhouse had been built up to the level of the generator floor, with embedded parts of the turbines in place.

Completion is to be carried forward by the government with the aid of the Harza Engineering Co. of Chicago. The Harza contract calls for specifying and purchasing the remainder of the machinery in the United States; design of the flood gates, emergency intake gates, entire electrical installation, switch yard, 150-mi. transmission line to Montevideo and switch yard there; design of a marine railway for transferring boats from headwater to tailwater and vice versa; and supervision and inspection of manufacture of equipment in the U. S. and general contact through a liaison man in the field.

Shortage of fuel in Uruguay led the Export-Import Bank to loan the government $12,000,000 to complete the Rio Negro project to reduce the amount of tanker capacity that must be diverted to supply Uruguay, that country being largely dependent on us for oil. So serious is the fuel situation that a 90,000 kw. steam station in Montevideo is now burning chiefly corn and sunflower seeds.

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DPC to finance extension of Plantation pipeline

The Defense Plant Corporation has agreed to finance construction of an 8-in. oil pipeline from Greensboro, N. C., to a point near Richmond, Va., as a further move toward relieving the serious oil shortage on the Eastern seaboard.

The 175-mile line will be built of second-hand pipe, to provide—together with a privately financed feeder line now under construction from the Houston-Beaumont area of Texas to Baton Rouge, La.—a through pipeline movement to the East Coast. The new line will be built by the Plantation Pipeline Company, at a cost of about $3,600,000, and will have a capacity of about 30,000 bbl. a day of gasoline and light petroleum products. It is expected to be in operation in about four months.

The Plantation Pipeline Co. now has a line from Baton Rouge to Greensboro (*ENR* Feb. 19, p. 303) with a daily capacity of 60,000 bbl.

Canada power restrictions placed in effect

Sharp restrictions on the use of electricity in Southern Ontario and Quebec went into effect Sept. 20, as Canada moved to conserve power for essential war industries in this area. (*ENR*, Sept. 10, p. 338).

The order was issued by C. D. Howe, Minister of Munitions and Supplies, through H. J. Symington, power controller. Under it, street lighting must be cut at least 20 percent; electric signs, indoor and outdoor ornamental lighting and small electric heaters are banned; the amount of light allowed in concert halls and similar places is limited.

The public is asked to cooperate by voluntarily reducing domestic consumption by 20 percent. These measures are expected to save 240,000 horsepower for essential uses.

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Illinois fills highway bureau engineering post

Vernon L. Glover of Sprinfield, Ill., since 1926 engineer of materials with the Illinois State Division of Highways, has been advanced to the post of assistant chief highway engineer. He succeeds M. J. Fleming, who resigned recently.

Mr. Glover has been an employee of the department since 1917, and as engineer of materials has been responsible for inspection of all materials used in construction and maintenance of roads and bridges built by the state and by counties and cities under state supervision. He also superintended the research and investigation work performed in the highway's laboratories. He is a member of the American Association of State Highway Officials, the American Society for Testing Materials, and the American Concrete Institute.

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A.I.S.C. convention set for Colorado Springs

The twentieth annual convention of the American Institute of Steel Construction will be held Sept. 29 to Oct. 2 at the Broadmoor Hotel, Colorado Springs, Colo.

All sessions will be devoted to war work, problems growing out of the national emergency and postwar prospects, according to V. G. Iden, secretary of the organization.

Toll rate increased on Golden Gate Bridge

Increased rates of toll designed to swell the annual revenue [illegible] more than $112,000 will go into effect on the Golden Gate Bridge at San Fran[illegible] as of October 1.

The Board of Directors of the Golden Gate Bridge district, in voting the toll increases, said that decreased civilian traffic resultant from curtailed pleasure driving, plus a large amount of military traffic which is non-revenue producing, are the reasons for seeking added funds. Bridge traffic records show that since 1938 there has been an increase of 439.2 percent in military traffic.

After October 1, the rate for private passenger cars will remain at 50 cents, but instead of covering driver and four passengers, the rate will apply only to the driver and two passengers; extra passengers will pay 10 cents each. On revenue-free vehicles each passenger not in uniform will henceforth be required to pay a 10-cent toll. Commutation rates are being increased and the rate charged bus companies for passengers will be raised from 1½ cents to 2½ cents.

Place Bay Bridge war insurance

War damage insurance in the amount of $48,000,000 was placed on the San Francisco-Oakland Bay Bridge July 1, according to the California Department of Public Works.

This amount of insurance is considered to be 80 percent of the full insurable value. Similar insurance has been taken out on the State Highway Bridge across Carquinez Straits, in the amount of $5,000,000 and on the Antioch Bridge in the amount of $1,000,000.

Premiums on all three structures cover a one-year period.

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Engineers help repel South Pacific foe

A group of United States Army engineers, working on an airplane landing field near Milne Bay, New Guinea, took part in the fighting some weeks ago when Japanese forces made a landing under cover of darkness, according to dispatches from Army headquarters in Australia.

According to the dispatches, the engineers dropped their shovels, picked up rifles and machine guns, and joined Australian troops in fighting the invaders. Although the airfield they were building was an immediate objective of the enemy, the American forces were said to have suffered only slight casualties and returned to their work immediately after the Japanese had been driven to cover.

OBITUARY

Brig. Gen. Thomas H. Rees, 78, expert on fortifications, died Sept. 20 at Walter Reed Hospital, Washington, D. C. General Rees, who retired in 1922, taught civil and military engineering at West Point in 1893-98, served in the War with Spain and became a colonel with the temporary rank of brigadier general during the first World War. He received the rank of Brig. General, retired, in 1930. During his long service he did engineering work on fortifications and river and harbor improvements in Florida, river and harbor work in Chicago and San Francisco and in the Philippines and Hawaii.

Geo. A. Ledward, Jr., 39, a bridge engineer and recently supervisor of naval construction work in Panama, died at Peterborough, N. H., on Sept. 15.

E. M. Vail, 67, a member of the staff of the city engineer of Plainfield, N. J., since 1929, died there Sept. 20. During his engineering career, he had been employed by F. A. Dunham & Company, civil engineers of Plainfield; the Central Railroad of New Jersey; the New York Central Railroad; the Gulf and Ship Island Railroad in Mississippi, and the New Jersey State Highway Department.

Willys Horatio Roberts, general manager of the Dominion Construction Co. and affiliated firms, died at Smiths Falls, Ont., Sept. 15. A civil engineer, Mr. Roberts had recently been at Corning, N. Y., supervising an army project there.

William G. Moler, 83, engineer on construction of railroads and highways, died recently at Springfield, Ohio. He had been for some years consulting engineer and special representative of the Republic of Mexico.

Edward A. Hurley, vice president and eastern manager of the Foundation Co. of New York, died at Quincy, Mass., Sept. 16. He was largely responsible for the design of the Bethlehem-Hingham (Mass.) Shipyard and recently built ways and a slip at the Fore River yard of the Bethlehem Steel Corporation. He had been associated with the Foundation company since 1917.

Albert Douglas Hill, 58, Philadelphia architect, died recently at Haverford, Pa. Well known for his designs of theatres and other large buildings, Mr. Hill had recently given up his private practice to work in association with the Corps of Engineers.

George F. Roth, 72, superintendent of construction for the Stewart Iron Works of Covington, Ky., died recently at Yakima, Wash., where he had been supervising construction of a city building.

Ross M. Sigmon, 50, former member of the North Carolina Highway and Public Works Commission, died at Salisbury, N. C., Sept. 11.

Francis J. Hughes, 60, Milwaukee, Wis., road contractor, died recently. In recent years he had been employed by the city of Milwaukee for road construction.

Ed Mann, 71, a member of the firm of Mann Brothers Building Co., Birmingham, Ala., died recently at Birmingham.

Sewage Federation to feature war needs

Municipal treatment plant maintenance in wartime, and operation of Army camp disposal works, will be featured at a conference of the Federation of Sewage Works Associations to be held in Cleveland Oct. 22-24. The three-day program, in which municipal, state and federal sanitary engineers will participate, also includes discussions on material priorities and an exhibit of equipment.

J. V. N. Dorr, president of The Dorr Co., is scheduled to address the convention on the "genealogy" of modern sewage treatment, tracing its development.

CONTRACTS AND CAPITAL

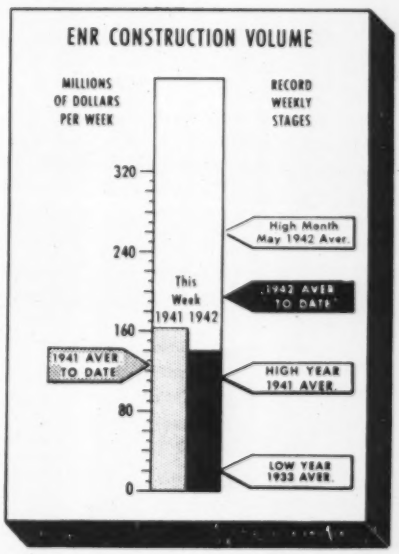
ENGINEERING CONSTRUCTION volume for the week totals $147,699,000, a decrease of 28 percent from the preceding week, and 10 percent below the total for the corresponding 1941 week. Private work is 9 percent under a week ago and 66 percent lower than a year ago. Public construction declines 29 percent from last week, and is 1 percent below last year.

The current week's volume brings 1942 construction to $7,632,606,000, an increase of 58 percent over the total for the 39-week period last year, and already 30 percent above the $5,868,699,000 reported for the 52 weeks of 1941. Private work, $474,740,000, is 51 percent below the volume in the period last year, but public construction, $7,157,866,000, is 85 percent higher as a result of the 131 percent gain in federal work.

In the classified construction groups, gains over the preceding week are in sewerage, industrial buildings, and streets and roads. Increases over the 1941 week are in waterworks, sewerage, commercial building and large-scale private housing, streets and roads, and unclassified construction.

New capital for construction purposes for the week totals $3,451,000, a drop of 63 percent from the volume for the 1941 week. The current week's total is made up of $3,401,000 in state and municipal bond sales, and $50,000 in corporate security issues.

New construction financing for the year to date, $9,530,701,000, is 63 percent higher than the $5,860,877,000 reported for the 39-week period last year.



CONTRACTS

(Thousands of dollars)

	Week Ending Sept. 25 1941	Sept. 17 1942	Sept. 24 1942
Federal	$123,490	$191,541	$132,736
State & Municipal	18,595	6,072	7,344
Total public	$142,085	$197,613	$140,080
Total private	22,359	8,415	7,619
TOTALS	$164,444	$206,028	$147,699
Cumulative 1942 (39 weeks)			$7,632,606
1941 (39 weeks)			$4,843,878

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1941 39 weeks	1942 39 weeks
NON-FEDERAL	$1,034,759	$563,803
Corp. Securities	311,817	169,859
State & Mun.	344,282	181,759
U.S.H.A. loans	30,399	
R.E.A. loans	100,500	
R.F.C. loans	84,761	129,455
Fed.-Aid—Highways	163,000	82,700
FEDERAL	$4,826,118	$8,966,898
TOTAL CAPITAL	$5,860,877	$9,530,701

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	Sept. '42	281.61	135.37
Building Cost	Sept. '42	225.46	121.88
Volume	Aug. '42	622	273

FHA MORTAGES

	Week Ending 1941 Sept. 20	1942 Sept. 12	1942 Sept. 19
Selected for appraisal			
Title II	$26,773	$5,410	$6,124*
Title VI	$3,371	$9,751	$13,173*

* Subject to revision.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Box Girders on Waterloo Bridge

Sir: When reinforced-concrete box girders are built on spans of 252.7 ft. and 242.7 ft., as they were in the new Waterloo Bridge at London, it is rather a pity that they should be called "arches"—(*ENR* April 30, 1942 p. 738) or merely "spans"—(*ENR* July 16, 1942, p. 77).

This is to urge that in the future they be "box girders."

HOMER M. HADLEY
Portland Cement Association
Seattle, Wash.

Planted Snow Fences

Sir: The article entitled "Planting to Control Drifts on Highways," by C. G. Bates in *ENR*, July 16, 1942, p. 92, is very informative. It occurs to me that you may be interested in some older experience which is set out hereinafter.

The locale is on the so-called Cambridge cutoff, a relocation of U. S. Highway 18 from a point about six miles west of Jefferson, Wis., to a junction with U.S. 12 near Cambridge. This was graded in 1931, one of the first of the so-called streamlined grading projects in this state. It was paved in 1932 and some roadside planting done. This included two evergreen (pine) plantings designed to control drifts. The following statement relates to the most easterly of the two.

As stated, the planting was done in 1932, which was a dry year. The year 1933 was also a dry year, and 1934 was a record drought. The following year, 1935, had a moderate precipitation, but 1936 was another drought year, worse even than 1934. Since that time we have had plenty of rain; 1937 had the usual amount of rainfall, 1938 was nothing out of the ordinary until September, when we had approximately 10 in. of rain in the last three weeks of that month, and 1939 was ordinary.

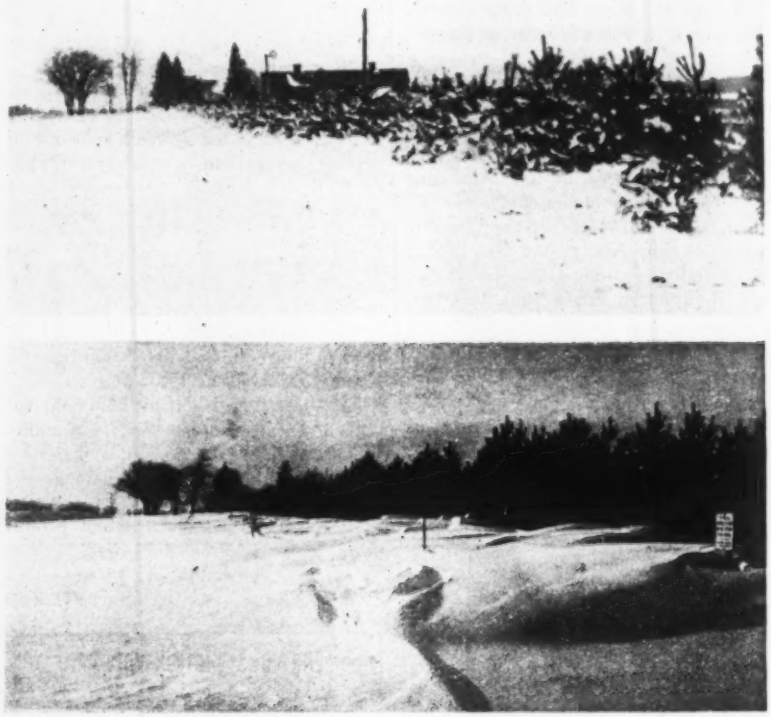
The condition of the planting is shown in the accompanying photographs.

The upper picture was taken during the winter of 1934-1935, just after the record drought of 1934. The planting nevertheless shows a good growth and there is some accumulation of snow in front of it.

The lower picture was taken from substantially the same point as the upper one, nine days after a heavy snowfall accompanied by severe drifting, which took place on Jan. 14, 1940. The five-year growth is plainly evident, as is the effect on the gathering of snow on the south side of the planting. Adjoining this planting is a snow fence of the conventional lath and wire type. There was much more snow on the south side of the planting than on the south side of the lath and wire snow fence. Whether this was of any particular advantage to the highway may be open to question, but if one of the objectives of snow-control devices is to keep the snow on the land, there can be no doubt of the superior efficiency of the plantings.

Of interest are the volunteer growths of willow which have sprung up along the roadside since the project was graded. In this state and probably throughout the Middle West, such volunteer growths assert themselves quite soon and within ten or fifteen years provide a job of roadside improvement which in my opinion is equal to, if not better than, most plantings. If the grading is done in such a way that the volunteer growths do not have to be disturbed, they will help to reduce the expense of plantings.

The earliest attempt to control drifting by means of plantings, of which I have knowledge, was carried out by the State Experimental Farm at Hancock, Wis., about 1930. This is in a considerable area of light soil located in the central part of the state. Within the last few years hundreds of miles of pine windbreaks have been planted, in some cases to control drifts along highways but in most cases to conserve soil moisture. The value of such plantings is very great, and it seems



Five years of growth of pine trees planted in Wisconsin to trap drifting snow. The upper picture shows that the trees in their third year (winter 1934-35) were quite effective in keeping snow off the highway.

that the work will continue on an even greater scale as its value both to agriculture and to highway maintenance is more widely appreciated.

M. W. TORKELSON
Director of Regional Planning
Wisconsin State Planning Board
Madison, Wis.

Temperature and Strength of Structural Steel

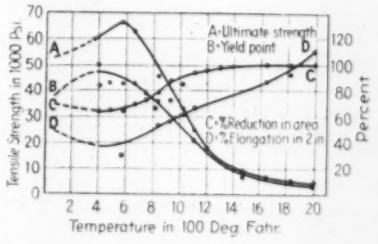
Sir: J. G. Shope's letter entitled "Steel Stresses and Heat" in *ENR* Aug. 27, 1942, p. 279, contains certain statements that should be corrected. He says "at this temperature (800 deg. F.) the elastic limit of structural steel is about 10,000 psi.," and "at a temperature of 800 deg. F., with a working stress of 16,000 psi., the elastic limit was 62½ percent of the working stress." An inspection of the accompanying chart, showing the physical properties of steel at high temperatures, would indicate that Mr. Shope's statements have no basis in fact and convey an incorrect implication.

Research on the strength of steel at high temperatures was first conducted, so far as I know, by J. F. Howard, engineer in charge of the United States testing machine at Watertown Arsenal, and the results published in *Iron Age* April 10, 1890. In these tests the method of measuring temperatures was not exact. In 1913 tests were made at the Elwood Works laboratory of the National Tube Co. Both of these investigations were made primarily to develop data applicable to power plant equipment.

Further research was conducted by the National Bureau of Standards in which the scope of the investigation was extended to include data applicable to fireproofed structural steel. These data were presented in June, 1926, before the A.S.T.M. in a paper by S. H. Ingberg and P. D. Sale. The National Tube Co. conducted their tests in tension on material of about the same chemical analysis as standard carbon structural steel and the Bureau of Standards tests were made in compression on cast-iron and light-rolled structural shapes.

All tests indicate that the ultimate strength increases about 25 percent when the temperature reaches approximately 500 to 600 deg. F., and that it returns to its normal temperature strength at about 800 deg. F. The ultimate strength at 1,200 deg. F. is about one-third the ultimate strength at normal (room) temperature.

Experienced research engineers know that it is difficult to devise a satisfactory method for determining the yield point at high temperatures. At normal temperature there is a difference of from 2,000 to 3,000 psi. between the proportional limit or the elastic limit and the yield point, but as the temperature increases the difference between these points increases and the straight line of the stress-strain curve, which represents proportional elasticity, shortens more than the yield point decreases. There is an increase in brittleness at the temperature of maximum strength and the National Tube Co.'s tests show that the percentage of elongation and reduction of area decrease also at this point but they increase again as the temperatures rise above 500 to 600 deg. F.



Physical properties at high temperatures of a steel containing .15 percent carbon, .027 percent sulphur, .027 percent phosphorus, .47 percent manganese, and .03 percent silicon. The diagram is reproduced from the 1924 National Tube Co. Handbook with the temperature readings in Fahrenheit instead of Centigrade.

Confirmation of the above facts may be found by reference to *Tensile Properties of Some Structural Alloy Steels at High Temperatures* by H. J. French, Bureau of Standards Technological Paper No. 205, Dec. 21, 1921; *Symposium on Effect of Temperature on the Properties of Metals*, A.S.M.E. and A.S.T.M., June, 1931; and *Compression Tests of Structural Steel at Elevated Temperatures*, by P. D. Sale, Bureau of Standards Research Paper No. 741, Nov., 1934.

F. H. FRANKLAND
Director of Engineering
American Institute of Steel Construction
New York, N. Y.

Dynamite Needs for Rock Work

Sir: In reference to "Heavy Rock Work Features Kentucky Road," in *ENR*, Aug. 27, 1942, I wish to call your attention to p. 69 wherein the contents in brief of this article states. "Common excavation totaled 100,000 cu.yd., and rock work 400,000 cu.yd. —over 2,000 tons of dynamite were required."

Assuming that the explosives were used only in the rock work, then that would mean that it required 10 lb. of dynamite per cu.yd. of rock. Inasmuch as the National Powder Co. furnished explosives on this job, I call this to your attention, for later on in the article you say "Consumption of dynamite averaged about 1 lb. per cu.yd. of rock excavation." That is about correct.

JOHN J. CRUMBAUGH
General Manager
National Powder Co.
Duke Center, Pa.

(Editor's Note: Mr. Crumbaugh is correct. The dynamite consumption was about 1 lb. per cu.yd. and totaled 210 tons in all.)

Misplaced Manpower

Sir: I recently noticed several items in *Engineering News Record* with regard to postwar planning, and wish to mention one consideration therein which is pointed by an item in the Aug. 27 issue, p. 276, that the Connecticut Highway Department is preserving its personnel structure by having some 200 engineers, surveyors, etc. serve as guards for their important bridges, thereby providing continued employment for these men and preserving the highway department engineering organization.

I cannot but deplore both this action as well as the tendency to utilize considerable engineering force in planning postwar employment when my own situation constructing a vital war facility is so desperate that for the past six months I have been unable to secure enough transitmen to adequately lay out the work, and I am currently using men of little experience and inferior skill perforce, entrusting to them the layout designs of costly engineering work with only occasional opportunities for checking and supervision.

This procedure has already, as it inevitably must, led to an increase in the number of mistakes, more or less costly, which must be rectified by rebuilding, or by the use of additional materials as the work goes on.

Area Engineer
(A U.S. Army Air Field)

EDITORIALS

VOLUME 129 NUMBER 13

September 24, 1942

In the Van of Fighting Men

A MILITARY ORGANIZATION, new in form, but not in conception and spirit, is described in this issue. The "Seabees" (Construction Battalions in the official records of the U. S. Navy) may be said to find their origin in the need that many years ago resulted in creation of the Marines, the amphibian fighters of our armed forces. But in closer analogy they find precedent for their establishment in the special army units that were an outstanding development of World War I, the railway and highway construction regiments and the water supply units. Like those units, the Seabees are being recruited from and are commanded by construction men who need no training in construction. Their chief need is training in military organization and in how to handle the special equipment that they are to use in their new work. This training is being given to them in large doses. In a few weeks time they are ready for their assigned jobs, that of establishing an airfield or an operating base on an alien shore. In carrying out this task the chance of their becoming involved in fighting is probably better than even. The Seabees will be in the van of fighting men. For the young man with a construction background, who wants to get into the fight, the Seabees offer an unparalleled opportunity.

Steel Design in Wartime

NO ONE CAN READ the new national emergency specifications for the design, fabrication and erection of structural steel for buildings without being aware that they were drafted by men who know we are at war. Charged with saving as much steel through design procedures as reasonable safety will permit, the WPB Specification Branch and its technical advisers pulled no punches and did no pussyfooting. They raised the unit tensile stress 20 percent, which in itself could have constituted the entire emergency change, as it does in Canada. But they went further and, through a directive that accompanied the specifications, required that joints be designed for continuity and be welded to the greatest extent possible. Prescribing methods of design and fabrication that must be followed is, of course, unorthodox, and in peacetime, not technically sound, but there will be few who will quarrel with such procedure as an emergency measure. It is interesting to speculate upon the effect that use of such emergency specifications will have on postwar specifications. Conceivably they could influence an increase in unit stresses; and they might create universal acceptance of structural welding. The WPB Specifications Branch accomplished a useful and significant job in its first attempt at major emergency specifications. It took too long to get them adopted, but the experience gained may permit faster progress on the next specification that is tackled.

Gas Tax Diversion Backfires

FALLACY OF GAS-TAX DIVERSION is now being forcefully demonstrated to those states that have succumbed to the temptation of appropriating these funds for other than road use. The highway industry and this journal have often emphasized that this levy is not a tax but a special service charge paid by motorists for the right to use a state highway system. The more traffic, the more revenue to maintain and expand the system. And, although not contemplated in the establishment of the principle, any decline in traffic and resulting revenue would affect only the highway user. Today, war regulations have made serious inroads on these revenues in many states, especially in the East. Where reserved for highway purposes, these declining funds are still relatively proportionate to requirements. But in those states where legislatures have made diversions to the general fund, relief, the school system or oyster propagation, the present decline in revenues has brought retribution that is as harsh as it is just. The legislatures that avoided finding money for relief or for their school systems by diverting road money to those operations must now find money to keep their roads from going to pieces.

Conversion May Cause Collapse

IN THE NEWS PAGES of this issue mention is made of the collapse of two old buildings that had been pressed into service as storehouses. Whether or not the structures failed from overloading, the accidents suggest that care must be exercised in converting buildings to uses for which they were not planned. For buildings in good repair, the original plans may indicate the safe load limit, as may the building code at the time of construction or a report from the original designers. But for very old structures or those subjected to a use that may have

caused rapid deterioration, questionable loads should only be applied after a competent engineer has made an investigation. Certainly the time and money spent to avoid possible loss of life or of the structure and its contents is a good investment.

Finding Men for War Jobs

ON A PRECEDING PAGE an army engineer officer expresses justifiable indignation over his inability to get adequately trained men for engineering work on an airfield, while in another part of the country a highway department is putting its engineers on bridge-guarding jobs to keep them employed. His problem is not unusual, which makes it the more regrettable. And it points to the fact that voluntary and haphazard means for finding men for jobs must be supplanted by a system under which needs such as those of this army engineer will be met by drafting men from less essential work.

With respect to engineers, a voluntary system has been set up by the War Manpower Commission under which firms doing war work are expected to hire engineers through the U. S. Employment Service. The latter agency hopes to be able to meet these demands from applicants or to suggest names from the Roster of Scientific and Professional Personnel. The trouble with this system is that it is still voluntary.

What appears essential is a compulsory recording with the WMC of the qualifications of every engineer not now in military service. Any change in status would have to be recorded with the WMC, and, in work classified as war work, shifts in jobs would not be permitted without authority from the WMC. Canada has had a system closely approaching this in effect since last spring.

A system of requisitioning men would work hardship at times, but it would be no more than we ask of soldiers. More often, as the nation shifts over to a full war status, the system could be expected to help men thrown out of work to find jobs on which they can make a valuable contribution to the war effort. Fortunately, there are signs that some such system of requisitioning is finding support in the halls of Congress. The army shifts its men quickly to the front on which they are most needed; the civilian forces of engineers and skilled workmen behind the army must be in a position to take similar swift action.

The Construction Price Ceiling

IN PROPOSING a price ceiling order to govern non-war construction, the Office of Price Administration is evidently attempting to provide a companion piece to the contract renegotiation requirements that Congress imposed on war construction. Thus there is to be a brake on disproportionate profits, no matter from what type of construction they are derived. No one will quarrel with this objective, but since the excess profits tax already assures it, there is serious question whether either a price ceiling or renegotiation are necessary. Both greatly increase the amount of paper work a contractor has to perform; both require the use of manpower and time that could better be used directly in the war effort; and both can readily sow the seeds of bankruptcy in contracting organizations whose continued existence is necessary to winning the war.

A price ceiling will be particularly difficult to apply to construction, because there are no fixed profit and overhead margins for construction jobs, no two of which are ever alike. To put a ceiling on such an item will make competitive lump-sum bids all but impossible. If negotiated lump-sum contracts are attempted, estimates will always be at the ceiling, so as to secure as much protection as possible; and in this event, inflated costs are invited. Thus, imposition of a price ceiling on construction will probably have one of two results: it will either make all jobs cost-plus, or it will cause them to be done force-account. Neither of these offers the nation as good a possibility of fair costs or freedom from inflation as does the present system, with price ceilings on materials and equipment, and recapture of excess profits.

In the broad sense, perhaps, the ceiling price order is not particularly important because it applies to less than 10 percent of total construction. Still, the fact that it will make this part of the nation's present job harder, without accomplishing any real good, is cause for concern. The OPA should mark time on making its order effective in the hope that Congress will repeal its renegotiation requirements on war contracts. This Congress will do if it can put winning the war above political considerations. If Congress fails to act, then OPA should at least revise its order so that it will be possible to apply it without disrupting an essential part of the nation's economy.

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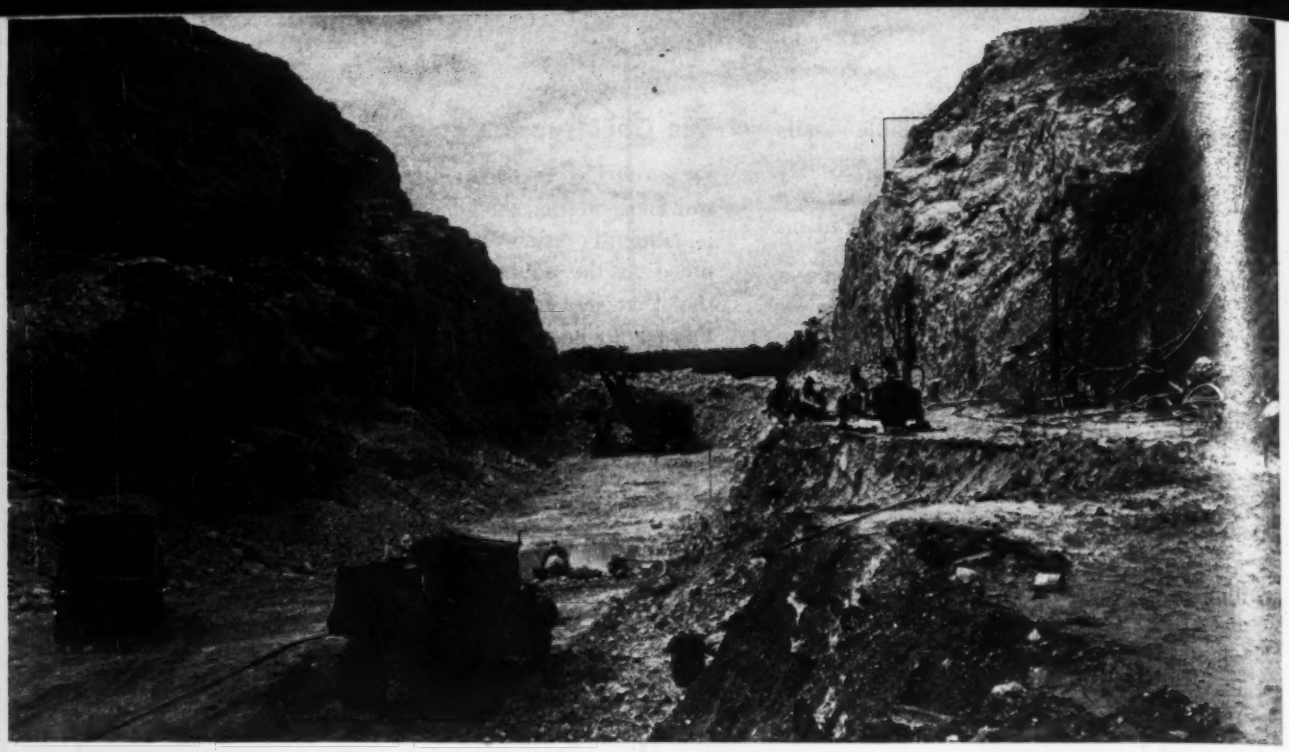


Fig. 1. Requiring 200,000 cu.yd. of rock excavation, Hooker Hill cut is one of the biggest in Missouri.

How Missouri Builds Access Roads

***Contents in Brief**—In order to provide better roads in the vicinity of Fort Leonard Wood, 12 miles of U. S. 66 is being improved from a winding route with a single traffic lane each way to a four-lane divided highway. A four-mile parkway of similar construction is being built as an access route between Route 66 and the camp. Maximum grades are restricted to 5.7 percent, which is resulting in one cut 100 ft. deep, or the deepest rock road cut in Missouri. Horizontal curves are limited to two degrees and sight distances to 1,000 ft. horizontally and 800 ft. vertically.*

BIGGEST HIGHWAY PROJECT now underway in the state of Missouri is a 12-mile improvement of U. S. 66, and construction of a new access road from that route to Fort Leonard Wood. The work is notable in that it requires a rock cut that will be the deepest on any highway in that state.

These improvements to U. S. 66, which is a strategic highway, are in a very hilly area. The work starts about a mile west of the town of Waynesville where Route H branches off and extends eastward for twelve miles. Before the present construction was begun, the road had very poor alignment and provided but one lane of traffic each way. When the construction now in progress or planned is completed, a four-lane, divided highway of excellent alignment and low grades will be available. The present program is part of the plan to improve U. S. 66 for the greater part of its length in Missouri. None of the construction had been started when the War Department began to build Fort Wood.

For about five miles on Route 66 the old road will be abandoned completely and two 22-ft. roadways built. For the remaining seven miles now being improved, the old route will be used on one roadway (Fig. 2). Where two completely new roadways are required they are to be separated by a 30-ft. seeded median strip, except for the section through the deep rock cut previously mentioned. For this part of the work an island of 6 ft. minimum width is employed to reduce the rock excavation required (Fig. 3). All the new roadways on Route 66 are to be 8½-in. thick, non-reinforced concrete slabs. The maximum grades are 5.7 percent and for the most part the grades are much less than 5 percent. The greatest horizontal curvature is two degrees, except for two 400-ft. radius curves for the legs of wye where the access road to Fort Wood branches off.

Big cut 250,000-yd. job

Most interesting part of the work to date has been construction of a 100-ft. deep cut of 1,000-ft. overall length, which required 250,000 cu. yd. of excavation. Some 200,000 cu.yd. of this excavation, which is known as Hooker Hill Cut, was rock, mostly chert and dolomite. Clearing for this cut started last October and earthmoving about a month later. This phase of construction is to be completed by Aug. 1, a rapid schedule not having been possible because of the extensive rains that often caused shutdowns of a full week.

Bottom width of the cut is 86 ft., at the point of maximum depth. The sides are vertical for about 50 ft., next stepped back roughly 12 ft., and then carried up on a ¼ to 1 or ½ to 1 slope, depending upon the condition of the rock (Fig. 3). The overburden is rounded to prevent slides, but no

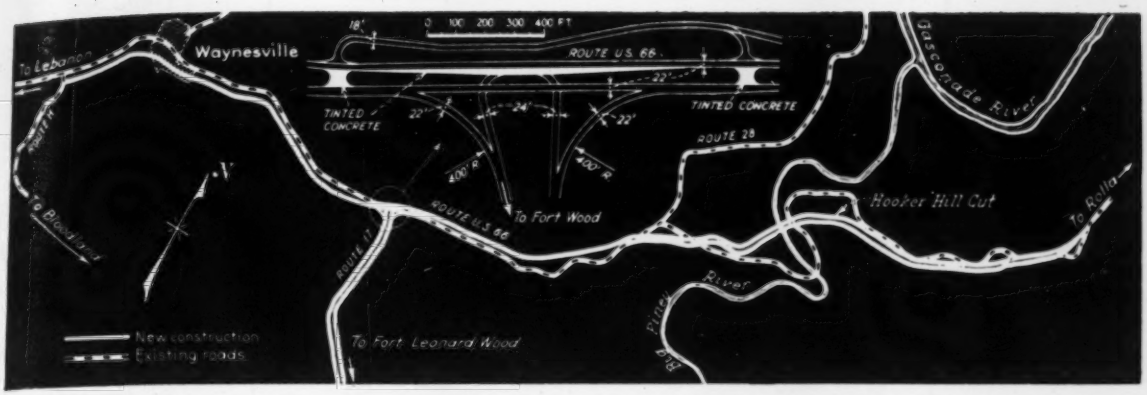


Fig. 2. When the improvements in progress or soon to be started on Route 66 are complete, a four-lane road will be available for 12 miles in the vicinity of Fort Leonard Wood. Originally an underpass was planned to eliminate all grade crossings where the road to the camp branches off, but now the wye arrangement shown in detail above will be built.

diversion ditches are used over the crest of the hill parallel to the center line of the highway.

Excavation for Hooker Hill cut started at the very top and was carried downward in 15-ft. depths for about a 30-ft. width along the center line of the road. Once this excavation had been completed for the full length of the cut, work started on the sides. This method proved very satisfactory and was considered a more successful method than excavating for the full width of the road during the first stage, since a saving of dynamite resulted. Use of the dynamite averaged about ¾ lb. per cu. yd. of rock removed, or 50 tons in all.

The excavated material was used for a fill on both sides of the cut and provided nearly enough material for 2,000 ft. of road on either side, despite the fact that the east fill has a maximum height of nearly 60 ft. All excavation was loaded by two shovels of 1¼ and 1¾-yd. capacity and transported by about ten 5-cu. yd., end dump trucks. When the overburden was placed as fill the material was spread in about 1-ft. layers and compacted with sheepsfoot rollers. However, for the rockfill no compaction other than that from the trucks and the bulldozers was necessary. The contractor's unit bid price for excavation and disposal of the material was 27c. for the Class A earth and 77c. for the Class A rock. The total construction cost for Hooker Hill cut, exclusive of paving, is expected to be $200,000. The pavement through the cut will be placed on a 6-in. layer of crushed rock of 3½-in. maximum size. The contract for this work is to be awarded at an early date.

Hooker Hill cut shortens Route 66 by one mile. Assuming an operating cost of 3c. per mile for the average traffic of the past few years, in ten years the shorter route made possible by the cut is expected to result in a saving equal to all construction costs for that section of the new road.

Steel shortage eliminates overpass

Where the access road to Fort Wood branches off from U. S. 66, a reinforced-concrete underpass was originally planned to avoid a grade intersection at that point. However, the difficulty in obtaining steel has been so great that this plan has been abandoned. Instead a wye intersection of the design shown by Fig. 2 and estimated to cost $167,000, is now under construction. As previously mentioned, the 400-ft. radius of this construction will be the maximum curvature on the roads now under construction.

Road to Fort Wood

For the 4-mile access to Fort Wood two 24-ft. roadways separated by a 30-ft. seeded island are being built, the shoulder-to-shoulder width 98 ft. This road is under construction by the WPA with grading and paving equipment rented from a general contractor on a unit price basis. The only labor the equipment owner must supply are the operators and the rate of pay is 31c. per cu. yd. of material excavated and placed as fill and 85c. per square yard of concrete in place. Here the pavement is also a 8½-in. non-reinforced slab. Already two miles of this road has been opened to traffic and grading is complete for the remainder. This work is costing about $160,000 per mile. Alignment on this highway is excellent, since the maximum curve is two degrees and the maximum grade four percent.

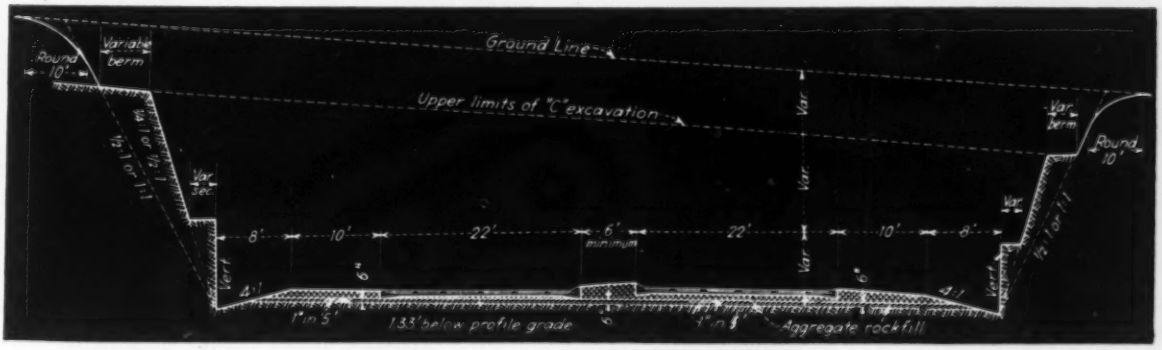


Fig. 3. Maximum cut required is the 100-ft. deep cut through Hooker Hill. To reduce excavation the median strip between the two roadway slabs is reduced from 30 to 6 ft. for this portion of the project.

The work on U. S. 66 is being done by the Missouri State Highway Department, C. W. Brown, chief engineer; J. J. Corbett, construction engineer; P. H. Daniells, head of plans and surveys; and C. L. Crawford and W. A. LaRew, project engineers. Grading and excavation for the Hooker Hill cut is being done by Fred Weber, Jr., St. Louis, and O'Dell and Riney, Hannibal, Mo., has the paving and grading for a 3.2-mile section east of where the access road branches off to Fort Wood. The Gillioz Co., Monett, Mo., was the successful bidder on the intersection. From Perry McGlone, Kansas City, the grading and paving equipment was rented for the work by the WPA, for which C. L. Crawford is resident engineer.

On June 27 bids were opened for construction of the necessary Big Piney River Bridge, which will have two reinforced-concrete arches and three steel deck girder spans. Bids were also opened for the approaches to the bridge and for paving and grading a 2.4-mile section to the east of Hooker Hill cut. However, since only a few proposals were received, all bids were rejected, and new proposals were opened July 31 for 4.7 miles of construction, including the Big Piney River Bridge. The work remaining to complete the 12-mile improvement on Route 66, which includes grading and paving, will not be advertised for some time. The entire 12-mile project on Route 66 is estimated to cost between three and four million dollars and on July 15 roughly $800,000 of this work was under contract and well advanced.

Land-Use Clinics Aid Cities In Utilization of Tax-Reverted Property

LAND-USE CLINICS where city officials learn to conserve land resources and plan their use are taking Michigan municipalities a long stride forward in their battle against urban land misuse and chronic tax delinquency, according to the American Municipal Association. Developed as a series of training schools for officials of the cities and towns in the state's 47 northern counties, the program already has produced these results:

More than 117 cities and towns have submitted land-use plans meeting approval of the state department of conservation, in charge of the program, for use of tax-reverted land within their boundaries.

Of 20,000 or more parcels of urban land reverting to state ownership in 1939 for tax delinquency, 3,137 have been deeded to the 117 cities for use as parks, playgrounds, streets, parking lots, building areas, airports, forest preserves, docks and schools; 283 to schools, 16 to churches, 8 to counties and townships. Eighty parcels have been exchanged for property owned by private individuals.

In addition, 4,173 parcels are being held by the state at request of cities planning to use it in the future. The remaining 13,371 parcels have been or will be offered for sale at public auctions by the state at recommended minimum prices.

The urban land-use clinic plan took shape in 1939 when nearly 2,250,000 acres of rural land and more than 20,000 parcels of land within limits of cities in the 47 northern counties reverted to state ownership through non-payment of taxes. Added to existing holdings, the reversion brought about 22 percent of the land area of these counties under state ownership.

The fact that a vastly increased number of parcels were located in cities and towns with little or no previous record of state ownership emphasized the seriousness of the situation.

Officials of the communities took up the problem with the conservation department and the Michigan Municipal League, and in early 1940 two series of training schools were scheduled to instruct the officials in dealing with tax-reverted land problems and in planning for use of the land.

Two instructors and a conference leader furnished by the conservation department conducted the clinics, held in 27 localities from June 5 to 12 and Aug. 12 to Sept. 20, with more than 400 city officials attending each series. At the first meetings instructors explained the land-use program and opportunities it offered communities for disposing of tax-delinquent properties to their advantage by analyzing the problem and planning for use of the land over an extended period.

It was pointed out that tax-reverted land could be deeded to cities for a fee of $1 a deed if city officials believed the land better suited for public than private use, or it could be held by the state for future use, position, traded for property held in private ownership, or returned to private ownership and the tax roll—if there were any indication it would remain there—through public land auctions.

Programs checked by state

Following the conference local officials were urged to send their programs to the conservation department for approval as soon as possible, and the department early in 1941 sent out field consultants to help officials complete their plans.

Upon receipt of municipal land-use programs bearing approval of the city council, the conservation department checks them for completeness and clarity. If incomplete, they are returned for necessary additional data; if satisfactory, they are sent to the land appraiser, who visits the communities and goes over suggested sale prices of land officials believe should go back to private ownership.

After the program has been approved by the appraiser it is returned with his recommendations to the conservation department and submitted to the conservation commission for approval.

The following table shows the total number of parcels deeded to 117 cities and towns by the state from December, 1940 to August, 1942, and purposes for which the cities will use land deeded them.

Use	Parcels
Street	219
Park and recreation	1,040
Airport	387
Parking lots	142
Park and forestry	607
Municipal bldgs. and storage	76
Water system	95
Cemetery	96
School	31
City dock	5
Municipal garden	67
River beautification	7
Gravel removal	31
Sewer system	40
Animal pound	2
Dumping grounds and park	292
Total parcels	3,137

The fact that the United States is at war has not affected the program materially, according to the department, except that five or six of the municipalities have applied for a considerable number of parcels to enlarge their airports.

Seabees drag a gun from a landing barge; concrete mixer is next.

The Seabees Are Coming

Waldo G. Bowman
Editor, Engineering News-Record

The title of this article might also be "Join the Navy and Build Its Bases Abroad," for that is the function of the Seabees, the Navy's new Construction Battalions organized under the direction of the Bureau of Yards and Docks. The Seabees offer construction men an opportunity to serve their country by working at their old familiar jobs in far-away places at specialists' ratings. Already they are developing an esprit de corps rivaling the best in any of our military services, and some are even now building and perhaps fighting on several of our battlefronts.

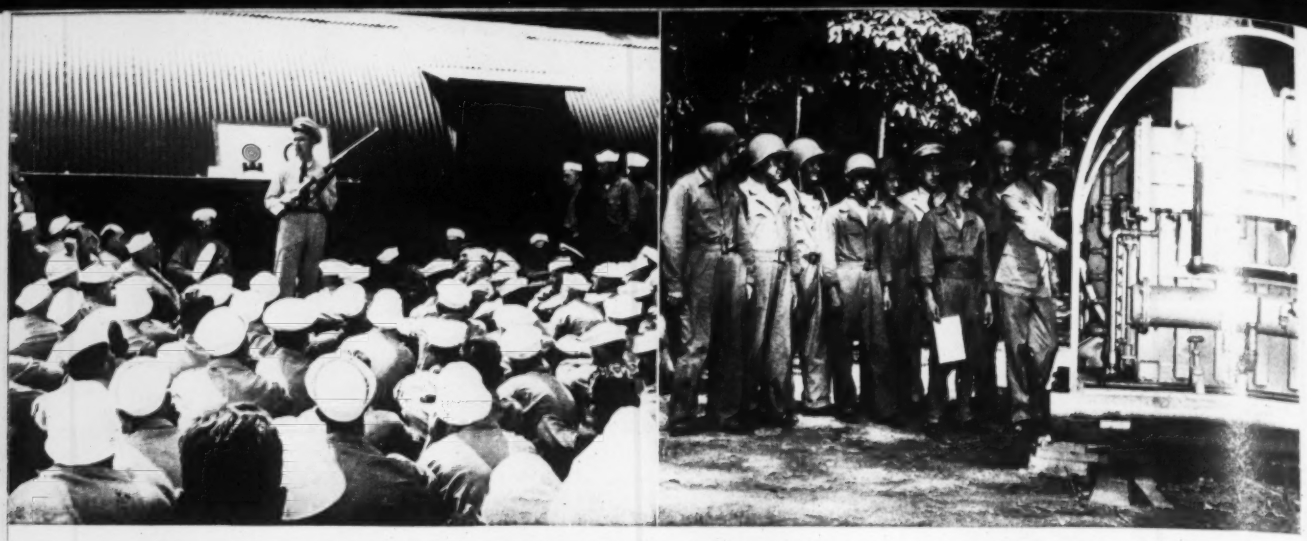
At Special Training Camps among the dunes, swamps and scrub-laden wastes bordering the ocean shores of Virginia and Rhode Island are being fashioned these days the beginning of a new and significant chapter in U. S. Naval history. Its heroes will not be the Navy's men of the sea, but civil engineers and construction specialists. Its recorded actions will not take place on, under or over the sea, but on land, at advanced shore bases pushed ever closer to the enemy's strongholds. Its story will be that of the Seabees, newest units of Uncle Sam's Navy, whose name is derived from the phonetic pronunciation of C.B's, abbreviation of Construction Battalions, and whose officers belong to the Navy's Civil Engineer Corps.

The Seabees were born when the Japs attacked Pearl Harbor and captured Guam, Wake and Cavite, thereby making untenable the construction of advance base facilities by civilian contractors. With every advanced base a potential point of combat, and every newly won beachhead a construction site, only naval personnel under military command could do the job. So, for the first time in its long history, the Navy decided to "roll its own" in the construction business.

The results bode no good for Hirohito or his allies, because every few days, a battalion or two at a time, Seabees are leaving their special training camps for one of the far-flung battlefronts of this global war.

THE SEABEE SYMBOL

Coupled with the invitation "Enlist in the Seabees," the symbol reproduced at the top of the page makes one of this war's most distinctive posters. It depicts a tough-looking bee carrying wrench, hammer and spitting Tommy gun. His sleeves bear the naval rating badges of gunner's mate, machinist's mate and carpenter's mate, as well as the insignia of the Civil Engineer Corps of the Navy. Fighting mad, the Seabee is bent on building bases for the Navy and even defending them if necessary.



Rifle class gets underway outside a Quonset hut (left) while a specialist class (right) examines the valves of a salt water evaporator. The pictures typify the two objectives of Seabee training—to teach the men military science and to familiarize them with advance base gear.

Their destination may be India or Ireland, Alaska or Australia. It could be an island in the Caribbean or an island in the Pacific. Indeed, of any place where our Navy needs bases of operation or repair for vessels or aircraft, it is proper to say "The Seabees are coming." Some of them, in fact, are already there.

At the Naval Construction Training Center at Norfolk, Va., several weeks ago, I asked a warrant officer who had served in the regular Navy from 1915 to 1926, and had recently rejoined for another hitch, what he thought of the Seabees. "They're going to give the Marines some real competition for the headlines before this war is over," was his answer. "And I'll tell you why," he went on. "To a man, these fellows have a pride in their outfit and its purpose that is not surpassed anywhere in the Navy. Add to this the fact that they are already experienced in their jobs from civil life, that being construction men they know Nature and the hardships she sometimes imposes, and finally that they have learned the hard way how to use their hands and their heads, and you have something that is hard to beat. Give them a gun to defend what they build and no German or YBB—Jap to you—is going to find it easy to push them around. The Seabees are okay. I'm proud to be one of them."

That description tallies pretty well with my impression after a rather detailed inspection of the work at Norfolk's two training centers—Camp Allen where the men are indoctrinated in Navy discipline and customs and given some preliminary training, and Camp Bradford where advance training is carried on. As one Seabee expressed it, "Just let the Marines get the situation well in hand and the Seabees will go to work. Or if the Marines need some help, we can provide that too."

OFFICERS BRING EXPERIENCE TO THE SEABEES

Lieut. Comdr. A; graduate of University of Florida, 1922; railroad construction, engineering supervisor for moving pictures company.

Lieut. A; graduate Brooklyn Polytechnic Institute; subway and tunnel construction; in National Guard and Naval Reserve.

Lieut. B; graduate Virginia Polytechnic Institute; instructor at Institute; with U. S. Forest Service.

Lieut. C; graduate Virginia Military Institute; engineer for large industrial company; inspector for Corps of Engineers; state manager for excavating machinery manufacturer.

Lieut. D; graduate University of Washington; civil engineer for Chicago, Milwaukee & St. Paul Railroad.

Lieut. E; graduate University of Illinois; highway construction; construction for Sanitary District of Chicago.

Lieut. Comdr. B; graduate Bucknell University; steel building erection; state highway work.

Lieut. F; graduate Rensselaer Polytechnic Institute; highway, bridge and tunnel work for New York City; public works officer for the Navy.

Lieut. G; graduate University of Missouri; highway construction in Pennsylvania and Missouri.

Lieut. H; graduate University of Michigan; served in Navy 18 years; later on highway construction and research.

Lieut. I; graduate University of California; structural steel fabrication and highway construction.

Ensign A; graduate Rice Institute; residential construction work.

New naval tradition in the making

The history of the Seabees is short, but already full of the stuff that engenders proud traditions. For one thing they comprise the first enlisted men to work under the directions of the officers of the Civil Engineer Corps of the Navy and the century-old Bureau of Yards and Docks, since in the last World War the Bureau was able to accomplish its work abroad by the use of hired foreign labor. Toward the close of that war a construction battalion was formed at the Great Lakes Naval Training Station, but it never saw service, and its personnel was merely assigned to it from the regular Navy.

Camp Allen, the Seabee training center at Norfolk, is named for the commander of this early construction battalion, the late Capt. Walter H. Allen (CEC), USN. Beyond this one tie with the past, the Seabees have little in the way of tradition to build on. They do have, however, the example set by the hundreds of construction workers in the employ of private contractors who labored so faithfully at Wake, Guam, Midway and elsewhere in the preliminary stages of this war. John Paul Jones found in the example of the privateersmen of pre-Revolutionary days the spark for some of our finest naval traditions. Perhaps the Seabees can make as effective use of some of the examples of devotion to duty

and of heroism afforded by their own civilian predecessors.

The Seabees also have further just cause for pride both in their phenomenal growth and in the fact that their proportion of rated men, with correspondingly higher pay, far exceeds that of any other branch of the Navy. As an average, 60 percent of a battalion's strength is made up of rated men; and 10 percent of these are of chief petty officer grade. Age limits were placed between 17 and 50 to assure this unusual classification of personnel. The Seabees are truly a specialist outfit, and past engineering and construction experience makes it so.

As to rapid growth, before the declaration of war the plan of the Bureau of Yards and Docks was to organize just one regiment of three battalions (3,300 officers and men), whose job it would have been to check the construction work done for the Navy by private contractors. Pearl Harbor and December 7, however, brought forth a new conception of the Seabees: The construction battalions would have to build, not just supervise; and they would have to be capable of defending what they built. First the number of authorized regiments was increased to six, or a total of 20,000 men, then the figure was upped to 60,000. Today these 60,000 men are enlisted, and the goal is now nearer 100,000. It may reach 150,000, practically double the size of the whole peacetime Navy.

Officers are civil engineers

And finally the Seabees have their officers, all members of the Civil Engineer Corps, regulars and reserves, who do have traditions of long standing and a record of accomplishment that ranks with the best of the other naval services. Civil engineers have been employed by the Navy from its very beginning in 1775, although it was not until 1842 that the Bureau of Yards and Docks was established; not until 1870 that its civilian personnel was given officer status; not until 1898 that the first CEC officer became Chief of the Bureau; and not until this year that CEC officers were given the authority to command. Yet, in the meantime, the original complement of ten CEC officers, authorized in 1870, grew to 209, including reserves, during the first World War, and at the start of this one there were 146 regular officers on the roster. The present size of the CEC approximates 2,100 officers, and every effort has been made to avoid the slightest lowering of standards in securing them. A college engineering degree or the equivalent is required, and the great majority have had engineering, construction or managerial experience in civilian life. The Seabees will be led by officers who know their business.

Obviously, the Seabees are no ordinary outfit, either in their own minds or according to the tasks that their organizers have laid out for them to tackle. How do they get that way? What process turns a construction man into a Seabee in the brief period of eight weeks? It was to learn the answer to these questions that I sought and obtained permission to go to Norfolk. I could as well have gone to Davisville, R. I., where a duplicate Naval Construction Training Center is located or, in the near future, to Yorktown, Va., where a third will soon be in operation; but Norfolk, being the original establishment, seemed the best choice.

The start to be a Seabee

At Norfolk, wedged in among the many other naval activities of this busy port, is Camp Allen, the Seabee camp where the "boots," as newly enlisted men are called, are taught to drill, salute and shoot, and where they are introduced to the basic principles of their construction job and to the important characteristics of advance base gear. Several miles away is Camp Bradford, bordering on the sea and extending back into the woods and swamps, to which the boots "graduate" for advance training in the real business of the Seabees — building bases abroad. It was logical to start to learn about the Seabees at Camp Allen.

This place has the outward appearance of any other naval training sta-

Seabee landing party hits the beach on a pontoon-assembled barge. After casting the anchor, the barge will be grounded and an unloading ramp built immediately.

Building steel mesh roads across loose sand gives the Seabees a taste of things to come, and provides the welders with some interesting field practice.

tion where the standard two-story temporary-type barracks prevails. There are concrete streets separating the green-painted, stucco buildings. There are the ubiquitous station wagons, which are as much a part of the Navy ashore as boats are when it is afloat. There is a drill ground where platoons of men in dungarees and white caps march back and forth. And there are the usual long rows of warehouses.

The impression that this is a conventional layout, however, is soon dissipated. Many of the barracks are not barracks at all, but classrooms and offices. The largest warehouse turns out to be a laboratory where advance base construction gear is studied. On the drill ground are bleachers where the men sit while Marine drillmasters explain the fine points of combat and defense fighting. And over at one side are a line of Quonset huts, the insulated, electric-lighted and wooden-floored version of the World War Nissen hut, which at Allen serve principally as classrooms, although one is fitted up as a chamber in which gas-mask practice is held.

It is at Camp Allen that the men go through what Navy veterans claim is the hardest period in anyone's naval career—detention for physical check-up and inoculation. The first day is easy—assignment to quarters, medical inspection, getting Navy clothing and filling out an experience record card. Next morning, however, the job of converting construction men into Seabees begins in earnest. From reveille at 6 a.m. to taps at 9:30 p.m., there are few idle moments; and for three and one-half hours in both morning and afternoon each company follows a prescribed training schedule, one hour for this and one hour for that, for four solid weeks.

Items selected at random from the posted training schedule reveal the following activities among others: close order drill; articles for government of Navy; military courtesy; manual-of-arms; combat signals; rifle marksmanship; bayonets; extended order drill; 45-calibre pistol; hand grenades; chemical warfare; Thompson sub-machine gun; base layout; and air-raid protection. Emphasis obviously is on the military, and rightly so, for this is the phase of their coming job with which the Seabees are least familiar. The studies of base layout and raid protection, however, provide an insight into the real nature of the job ahead.

WHAT SEABEES ARE PAID

Rating	At Home	Abroad
Seaman, Second Class	$54	$64.80
Seaman, First Class	66	79.20
Petty Officer, Third Class	78	93.60
Petty Officer, Second Class	96	115.20
Petty Officer, First Class	114	136.80
Chief Petty Officer	126	151.20

Note: In addition, standard allowances are made for dependents.

Special technical training

For a group of picked men from each battalion, however, Camp Allen is the scene of much more intensive technical study. To understand how these men are picked it is necessary to recall the experience record cards that the men fill out on their first day in camp. These cards go to the technical training department, administered by CEC officers, where they are carefully sorted into groups reflecting particular kinds of skills in which the men have indicated that they have had a certain number of years of experience. Then, with this card information as a background, supplemented by observations of the men during the first few days of training, the technical training officers select twelve men for each of fifteen specialist classes of instruc-

tion, 1130 men in all from each battalion. These classes, except for the last four, which are reserved for advance training at Bradford, are begun at Allen and cover the following subjects:

1. Boilers and heating
2. Diesel and gas engines
3. Dynamiting
4. Evaporators and purifiers
5. Generators and electricity
6. Air-raid protection and camouflage
7. Pontoons, propulsion units and drydocks
8. Tanks and radio masts
9. Refrigeration
10. Welding
11. Small arms
12. Concrete forms and carpentry
13. Diving
14. Excavation and earthmoving
15. Hut erection and firefighting

Men chosen for these specialist classes are excused from other duty for half of each day, either morning or afternoon. Of the four hours spent on this special work, one is for lectures and three are for what might be termed laboratory activity, that is, familiarization with assembly, operation and repair of advance base gear such as water purifiers, salt water evaporators, boilers, pontoons, air compressors and the like; and practice in the handling of dynamite and welding torches.

Instructors for the specialist classes are chosen from the personnel, the choice being based upon their experience records and also upon their aptitude shown when they, themselves, were members of one of the specialist classes. Officers usually can tell after about two weeks whether or not a man is instructor material. Many of the instructors are college graduates, and all are construction specialists of one kind or another. Good instructors will probably remain at Camp Allen for some time, but eventually they, too, will be assigned to battalions for advance base duty.

Although the purpose of these specialist courses is to create a group of capable foremen, the men's ratings do not change by virtue of their potential positions as squad leaders. Advancement may only come in the field for meritorious performance. An occasional exception to this rule may sometimes occur in the case of a man who is made an instructor, but otherwise the original rating stands.

Lectures are serious business

It is worth looking in on some of these specialist training classes, for it is there that the true function of the Seabees first becomes apparent. Many of the lecture courses are held in Quonset huts, where one can without great effort forget he is in Virginia and imagine this is an advance base. On the day of this visit the locale necessarily would have been the tropics during the rainy season.

The first thing that will be noted on entering the "classroom" is that equipment is down to bare essentials —a bench just long enough for twelve men, a rough table in the center for the instructor and a blackboard on an easel. The instructor is a chief petty officer, perhaps 45 years old, dressed in khaki shirt and trousers. The students, some older and some younger than the instructor, are attired in light-tan coveralls, official work uniform of the Seabees. A seri-

SEABEES ARE SPECIALISTS WHO KNOW THEIR WAY AROUND ON CONSTRUCTION

A large number of naval ratings are open to men enlisting in the Seabees. Here they are:

Trade Rating	Naval Rating
Blacksmith	Msmth. 1c
Blacksmith helper	F. 1c
Bulldozer operator	M.M. 1c
Carpenter	C.C.M.
Carpenter	C.M. 1c
Carpenter	C.M. 2c
Carpenter	C.M. 3c
Concrete worker	C.C.M.
Concrete worker	C.M. 2c
Concrete worker	C.M. 3c
Construction worker	Sea. 1c
Construction worker	Sea. 2c
Crane operator	M.M. 1c
Deckhand (dredge)	Sea. 1c
Driller (quarry)	C.M. 1c
Electrician	C.E.M.
Electrician	E.M. 1c
Electrician	E.M. 2c
Electrician	E.M. 3c
Electrician	C.E.M.
Electrician (L. and Sta.)	E.M. 1c
Electrician (L. and Sta.)	E.M. 2c
Engine operator	M.M. 1c
Excavation foreman	C.C.M.
Fireman (dredge)	F. 1c
Gas and diesel repairman	C.M.M.
Gas and diesel repairman	M.M. 1c
Gas and diesel repairman	M.M. 2c
Labor foreman	C.C.M.
Labor foreman	C.M. 1c
Launchman	Q.M. 1c
Launchman	Q.M. 2c
Mate (dredge)	B.M. 1c
Mechanic	C.M.M.
Mechanic (Shop and Sta.)	M.M. 1c
Mechanic (Shop and Sta.)	M.M. 2c
Mechanic (crusher)	M.M. 1c
Oiler (crane and engine)	F. 1c
Oiler (crane and engine)	F. 2c
Shovel operator	M.M. 1c
Shovel operator	M.M. 2c
Painter	Ptr. 1c
Painter	Ptr. 2c
Painter	Ptr. 3c
Piledriver foreman	C.M. 1c
Pipefitter and plumber	C.S.F.
Pipefitter and plumber	S.F. 1c
Pipefitter and plumber	S.F. 2c
Pipefitter and plumber	S.F. 3c
Pipelayer	C.S.F.
Pipelayer	S.F. 1c
Pipelayer	S.F. 2c
Pipelayer	S.F. 3c
Powderman	G.M. 1c
Powderman, helper	G.M. 2c
Rigger	C.B.M.
Rigger	B.M. 2c
Rigger	Cox.
Road machine operator	M.M. 1c
Sheet metal worker (coppersmith)	Msmth. 1c
Sheet metal worker (coppersmith)	Msmth. 2c
Sheet metal worker	Msmth. 2c
Steelworker	C.S.F.
Steelworker	S.F. 1c
Steelworker	S.F. 2c
Steelworker	S.F. 3c
Telephone man	E.M. 1c
Telephone man	E.M. 2c
Truck driver	M.M. 2c
Truck driver	F. 1c
Water tender	W.T. 1c
Water tender	W.T. 2c
Welder	S.F. 1c
Welder	S.F. 2c
Welder	S.F. 3c
Wharfbuilder	C.C.M.
Wharfbuilder	C.M. 1c
Wharfbuilder	C.M. 2c
Wharfbuilder	C.M. 3c
* — — — — — — —	— —
Baker	Bkr. 1c
Baker	Bkr. 2c
Baker	Bkr. 3c
Barber	Sea. 1c
Boatswain	C.B.M.
Boatswain	B.M. 1c
Boatswain	Cox.
Chainman	Sea. 1c
Chauffeur	F. 1c
Chief of party	C.C.M.
Clerk	C.Y.
Clerk	Yeo. 1c
Clerk	Yeo. 2c
Clerk	Yeo. 3c
Cook	S.C. 1c
Cook	S.C. 2c
Cook	S.C. 3c
Construction worker	Sea. 1c
Construction worker	Sea. 2c
Diver	C.B.M.
Diver	B.M. 1c
Diver, (tender)	B.M. 2c
Draftsman (arch.)	C.C.M.
Draftsman (arch.)	C.M. 1c
Draftsman (arch.)	C.M. 2c
Draftsman (electrical)	C.E.M.
Draftsman (electrical)	E.M. 2c
Draftsman (mechanical)	C.S.F.
Draftsman (mechanical)	S.F. 2c
Draftsman (str. steel)	C.M.M.
Draftsman (str. steel)	M.M. 1c
Draftsman (str. steel)	M.M. 2c
Instrumentman	C.M. 2c
Mail clerk	Sp. (M) 1c
Mail clerk	Sp. (M) 3c
Photographer	P. 1c
Photographer	P. 2c
Rodman	C.M. 3c
Sailmaker	B.M. 2c
Steward	C.C. Std.
Steward	S.C. 1c
Storekeeper	C.S.K.
Storekeeper	S.K. 1c
Storekeeper	S.K. 2c
Storekeeper	S.K. 3c

*—Ratings above this line are for a construction company; those below for a headquarters company.

Building a gun mount base for a 4-in. rifle constitutes a "project of the day" that is only a light workout for the Seabees who, as civilians, were specialists in this sort of thing.

Having built its foundation, the Seabees mount the gun with a hoist improvised from blocking, screw jacks and cable. It all lends significance to the Seabee motto "We defend what we build."

ous alertness prevails that is not often encountered even among college graduate groups. Nor as I talked with the instructor was there any let-down in this attitude; if anything, there was a trace of resentment, felt rather than seen, at the interruption I had occasioned. The Seabees mean business. And that's all to the good.

The subject of the course was air-raid protection—how to build splinter-proof protection for base facilities, how to disperse equipment to avoid bomb damage, the principles of camouflage, etc. The instructor was not a long-time expert in the subject, but he had mastered its fundamentals, and there was a mimeographed text to follow. Often, he said, one of his students would indicate by an answer that he might know more than the instructor about a particular phase of the subject under discussion. On these occasions the student is encouraged to take over the in- on until his fund of knowledge exhausted. When a group of men pi d class at a subject in such a m learning is bound to result. N such democratic process fail t velop a valuable esprit de corps. is also to the good.

Getting to know their equipment

Next we visited a big w house, 30 ft. high to the ceiling, which has been divided into laborato rooms where actual advance base gear can be studied. It is presided over by a warrant officer with the title of junior technical training officer, an old-time Navy man who recently re-enlisted as a chief shipfitter and was transferred to the Seabees with a raise in rank. His superiors claim that nothing that moves by gears, cams, belts or electric current holds any secrets for him, and his colored freehand sketches, showing principles of operation of water purification units, salt water evaporators, welding machines, and the like, which adorn the walls of the laboratory, lend credence to the claim.

Making fresh water from salt water will be a prime job for the Seabees, and several different types of evaporators, both skid and wheel-mounted, are constantly being torn down and reassembled in the laboratory. In another section, various types of boilers are being studied, and one room is full of booths where facility with the welding torch is developed by practice. One bay of the building is devoted to pontoons, the prize exhibit being a standard pontoon section, a welded steel box about 5 ft. on a side, which is used to familiarize the men with this versatile gear, which can be connected to other similar units to make a landing barge, a pier or a floating drydock. Models of the unit, about one-twelfth actual size and with all necessary connecting apparatus, are used to introduce the men to assembly operations, which they will encounter full scale during advance training at Bradford.

Officers receive training too

So goes the four weeks of preliminary training at Allen, the men daily becoming more familiar with the job that is before them, until they are ready for the four weeks of advance training at Camp Bradford. The officers meanwhile arrive at this same point by an almost parallel route to that followed by the men. They spend four weeks of intensive training at

Camp Allen. They study naval customs and courtesy, and they learn to drill.

Lectures and classwork schedules are somewhat heavier than for the enlisted men, however, and the subjects are more varied. Thus naval correspondence must be mastered, and base layout is gone into more thoroughly. Equipment is studied and discussed. Mosquito control methods and sanitation in all its phases are emphasized. The officers must know all that the men know and then some!

Practice makes the Seabees fit

Shoving off from Camp Allen for advanced training at Camp Bradford is always a notable occasion, marking, as it does, the end of detention, with shore leaves in the offing, and the beginning of associations in the actual battalion that four weeks hence will embark for parts unknown, but far away.

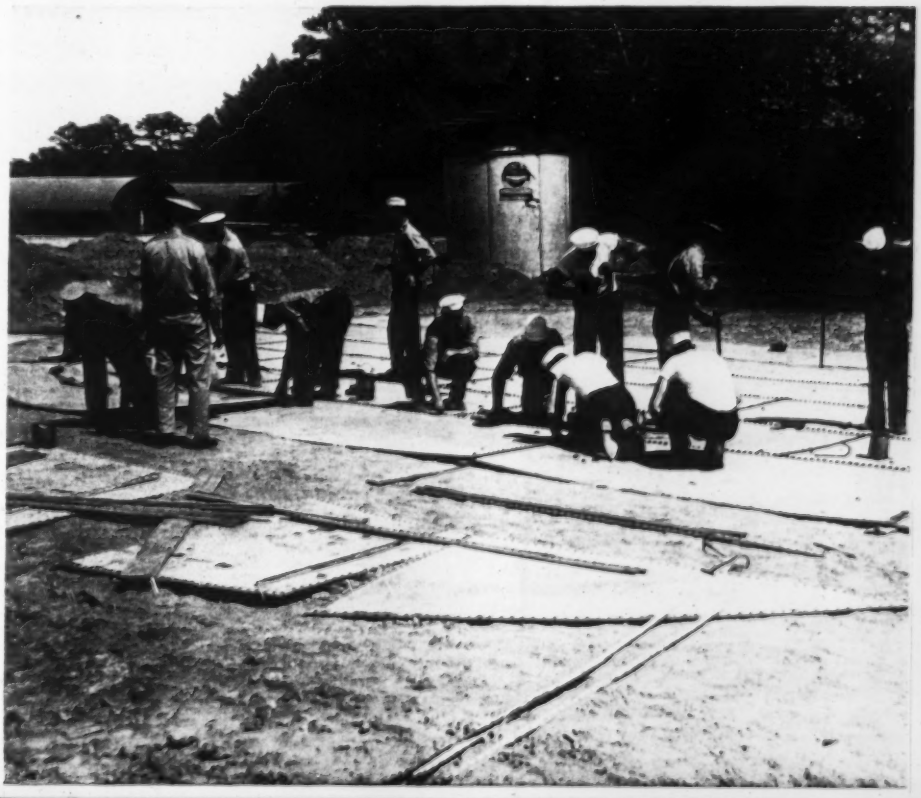
At Bradford the shape of things to come is made apparent. In the first place the camp itself is a replica of an advanced Seabee base. Quarters are in Quonset huts, fitted in among trees for concealment from the air; and with each equipped with only ten cots, the Seabees have more commodious quarters than any other branch of the armed services. Also, galley equipment and hospital facilities at Bradford are the same that will be used abroad. Then, too, the officers who will lead the battalion meet the men for the first time at Bradford. A lieutenant commander is Officer in Charge, and he has a lieutenant for executive officer. Each construction company, of which there are four in each battalion, is headed by a lieutenant, while an ensign is in charge of the single headquarters company. There is also a junior lieutenant for each construction company. Four ensigns and five warrant officers bring the complement of civil engineer officers to twenty. Two doctors, one dentist and two supply corps officers swell the total of commissioned officers in a battalion to twenty-five.

Now are assembled all of the men who will henceforth work as a team, and as the 59 different trades that are represented in every battalion are distributed among the six special platoons in each company—one for maintenance, two for general construction, one for waterfront construction, one for pipe and tank work, and one for electrical and mechanical work—the organization is complete. Lectures will continue, but practice in actual field operations is the real order of business.

Bradford was chosen as a site for the camp because it embodies in the 1,600 acres of its varied terrain many of the things that the Seabees may encounter when they land on strange shores. The long beach offers the difficulty of the sand bars for landing drills from barges. There are sand dunes on the beach over which equipment must be moved, and there are brackish swamps to breed mosquitoes unless preventive measures are taken. There are fresh water lakes, wooded uplands, lowlands thick with scrub-brush and

Gaining familiarity with the versatile pontoon units. Here they are being assembled into a landing barge, but they can also be used as piers, pontoon bridges and drydocks.

Tanks of many sizes are required at advance bases, and Seabees learn how to assemble them. Long-handled wrenches speed the work. Strips in the foreground are channel "washers" that keep the bolt heads from turning.



Learning to use a new type diving mask that is standard equipment.

open fields. It is ideal field-training terrain.

And hardly is one past the sentry box at Bradford until he is confronted with field-training activity. In an open space at the left, a group of men is alternately erecting and dismantling bolted steel storage tanks, ranging from about 1,000 to 10,000 barrels in size. Long-handled socket wrenches spin the nuts on and off as the bolt heads are held from turning by a long channel-shaped "washer" along the inside of the seams. Plates are handled by a gin pole or a crawler crane. The tanks go up and come down with surprising speed.

Not far removed from the tank farm another group is practicing on a Quonset hut. Prefabricated timber floor sections come first, followed by the steel ribs of the frame. To the inside of these ribs wallboard is fastened, and, as fast as rock wool bats of about the depth of the ribs are laid on the wallboard, the exterior of corrugated metal sheeting is bolted on. A Quonset hut, ready to live in, represents an eight-hour job for five men.

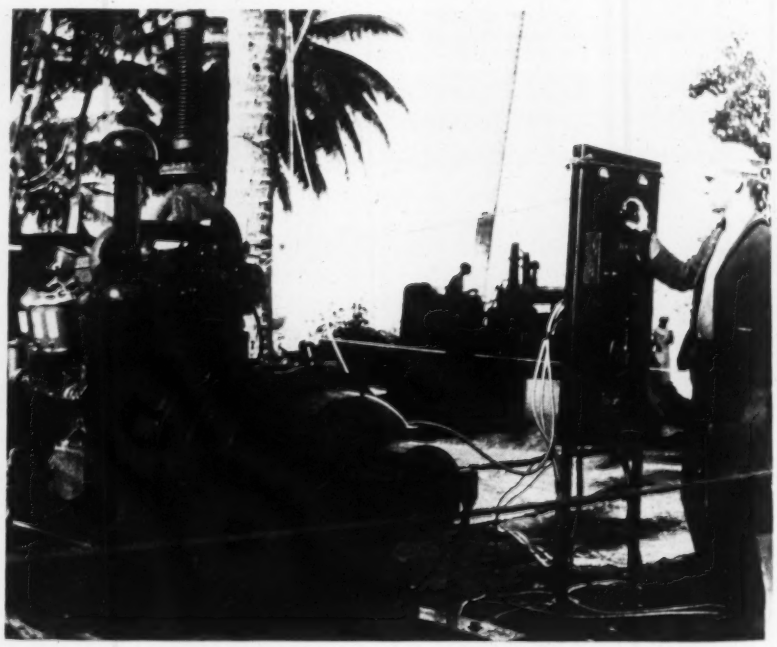
Such "work projects" as these occupy the men daily. The assignment may relate to permanent improvements in the camp, such as drainage ditches, roads or sidewalks. It may involve earthmoving, so that shovel-runners and bulldozer operators can get the feel of the equipment with which one day they may have to handle coral rock, frozen ground or loose, white sand. Or it may be the building of experimental timber huts that might come in handy if the Quonset variety were not available.

It is down at the beach, however, that the activities look like the real thing for which the Seabees are being trained. Here with sea and shore as the stage, the men practice the jobs which some of the battalions that have gone out from Bradford may even today be doing for keeps on the beaches of the Solomon Islands, or on the harbor front at Tulagi. A barge load of equipment rides into the breakers. Hand shovels build a sand ramp over which logs are laid for a corduroy surface leading from barge to shore. A tractor is first off, dragging a gun whose installation on the beach is the project of the day. A concrete mixer follows, and the men go to work building forms, setting anchor bolts, and placing concrete. The next morning the gun will be mounted. There is no time to wait for even seven-day concrete.

Down the beach a boat landing pier is being assembled from pontoon units, while on its other end a group of Seabees is being instructed in the use of special diving equipment. Nearby a steel cofferdam is being built to familiarize the men with their air hammers, compressors and pumps.

Familiarization, in fact, is the keyword of Seabee training. You can't make a construction man in eight weeks, and the Navy knows it. So it enlists construction men in the first place, crams as much of military manners and methods into them as possible, and then gives them only that amount of construction practice that is necessary to create familiarity with the general nature of the job ahead and with the standard makes of equipment that will have to be used. The performances already turned in by Bradford "graduates" attest to the success of this procedure.

As one walks back to camp over a sandy road "stabilized" by steel mesh mat sections, and recalls the picture recently released by the Navy, showing this same type of road being built by the Seabees at a new base in the Southwest Pacific, the value of these training activities is brought into sharp focus. The crack of guns from the rifle range echoes through the trees. The Seabees are coming. And they will be ready to work or to fight upon arrival.



The real thing. A generator unit set up on a Southwest Pacific island base by Seabees trained at Norfolk. A bulldozer does some grading in the background.

Removing Mud Pockets from Filled Ground

***Contents in Brief**—The practical problem of what to do about very large mud pockets in a dredged fill was solved by simple, effective means, using only equipment on the job, namely, bulldozers, draglines and dump trucks. Procedure was to excavate material from center of pocket as dry material was added and compacted around the edges.*

PREPARATORY to building a large supply depot for U. S. Navy use, it was necessary to pump in some 3,000,000 cu.yd. of material brought up by a suction dredge to make a fill 5 to 15 ft. deep. The best available material included some mud mixed with a large percentage of sand. After the fill was completed it was found that in many places the mud had collected in spots or "pockets" of considerable size. A few contained as much as 30,000 cu.yd. and were 100 to 125 ft. across. Although these pockets totaled only a small percentage of the total fill, they presented a considerable problem because of the very soft, slippery nature of the material involved.

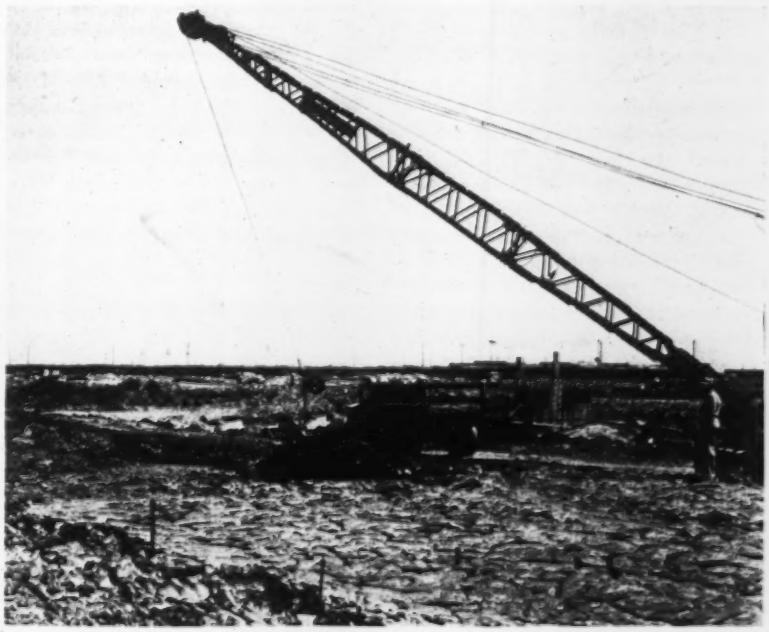
The mud was not a factor in building the foundations because piles were driven for all structures. However, in construction of utilities, such as storm drains and sewers, underground transformer vaults, pumping stations and even street paving, it was not feasible to work over and through the mud pockets. There was little opportunity for the mud to dry out and harden because construction had to be rushed immediately after the fill was completed. The demand for speed, therefore, required that methods be developed for providing the necessary stability in those portions of the fill where the mud pockets occurred. This was done successfully by methods described in the following.

After some experiment the procedure adopted was to excavate from the center of each mud pocket with a dragline bucket. The dragline rig, mounted on crawler treads and operating a ¾-cu.yd. bucket on a 60-ft. boom, worked out toward the center of the pocket from the side which offered the best support for the equipment, loading the mud into dump trucks as it advanced. Alongside and following the dragline came other trucks depositing red rock (a material that compacts well) and with them a bulldozer to spread the rock and crowd it forward into the depression caused by excavation with the dragline. By the time enough soft mud had been removed to lower the surface level materially in the center, rock was being dumped around the entire periphery and was being crowded forward, a little at a time, encircling the central soft spot. The bulldozer compacted the rock and worked it down into the mud, crowding the soft material forward toward the center.

As operations continued, the surface of the former pocket sank down into a bowl-shaped depression. Eventually, even in the largest pockets, the rock that was crowded downhill from the entire periphery caused the mud to boil up in the center of the bowl as it was replaced around the sides by rock under the compacting weight of fill and tractor.

When the rock fill had advanced from all sides and no more mud was being forced up at the center, the dragline withdrew and the bulldozer, continually supplied by material from dump trucks, completed the fill of the bowl-like depression, bringing its surface up to grade and compacting the entire area adjoining. When completed in this way the fills were entirely satisfactory for all purposes for which the area was developed.

The curing of the mud-pocket trouble was carried out in a more successful manner than was the method of disposing of the excavated mud. Short of the expense of delivering to a barge that could dump at sea, the best method found was to discharge the dump trucks in an area where they could back away from the spoil pile as the area covered increased in extent. In this way, by backing the trucks into the dumping point and pulling ahead to get away, it was unnecessary to provide means for getting the trucks over an impassable mud deposit.



Dragline bucket excavates from center of a mud boil as the edges are progressively stabilized by the addition of dry material.

Renegotiation of Contracts

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***Contents in Brief**—Many questions have been raised as to what contractors should do when faced with a demand for renegotiation of their contracts with federal agencies under an act passed in April. In this article two attorneys with long experience in handling the legal aspects of government contracts attempt to answer some of these questions.*

THERE HAVE BEEN ATTEMPTS in recent years sharply to limit the profits that may be made or retained by contractors on certain types of government contracts, but Section 403 of an act of Congress approved April 28, 1942, goes much farther and provides more stringent restrictions on the allowable profits from government contracts. (See acts of March 27, 1934, 48 Stat. 505; April 3, 1939, 53 Stat. 560 and June 28, 1940, 54 Stat. 676, all of which are summarized in Treasury Decision #5000, approved July 29, 1940, a copy of which for tax purposes, if for no other, should be obtained by all large contractors).

The statute passed April 28 undertakes to authorize or possibly require several things. Among the more important matters so authorized, or possibly required, are the following:

(1) It requires a "renegotiation" provision to be inserted in all contracts or subcontracts of the War or Navy departments or the Maritime Commission involving over $100,000, entered into after April 28, 1942.

(2) It possibly permits the Secretary of the Navy or the Secretary of War, or the chairman of the Maritime Commission to require a "renegotiation" of *any* contract or subcontract entered into by their respective departments or establishments either *before* or *after* April 28, 1942, and regardless of whether the contract or subcontract involves more or less than $100,000, when the respective secretary or chairman is of the opinion that "excessive profits" have been or are likely to be realized, and authorizes the withholdings or recovery of any such excess profits which are found as the result of the "renegotiation."

(3) It authorizes the respective secretary or chairman to require any contractor or subcontractor who has contracts or subcontracts with the government aggregating over $100,000, even though no one of such contracts or subcontracts equals or exceeds $100,000, to report upon costs of production, and upon such other financial matters in such form and at such times as the secretary or chairman may require.

(4) It authorizes the secretaries or the chairman to delegate the powers given under the act to a subordinate, and it further authorizes a re-delegation by the subordinate.

What does the act mean?

A host of questions as to the meaning, force and effect of this law are immediately suggested. Some of these are: (1) Can "renegotiation" of contracts, made prior to the date of the act, be required or enforced? (2) Can profits, large or small, *already earned* be taken away? (3) If one agrees *now* to a *later* "renegotiation" of the contract price presently agreed upon, what does it mean? Does it mean that the United States, by its authorized representatives, may later determine that the price *now* agreed upon, in the light of later developments, is excessive and of no effect? (4) Does it mean that *changes* in the agreed price can only result from a "renegotiation," that is, from a full and free, give-and-take, bargaining between the parties? (5) Or suppose the contract now made is found *unprofitable;* may the department head readjust the price so as to provide a *fair* return to the contractor?

It is the aim of the writers that this article should afford some light as to the proper answer, not to all the questions, but to some of the real questions of moment: What is a contractor *to do* when faced with a demand for a reduction of his contract price already agreed upon, where such contract and the price fixed thereby has actually been reduced to writing and signed, as required by existing law? Should the contractor take what is offered by way of adjusted price or may he insist on having what his contract has prescribed?

Contracts in force

The act seems to authorize and direct "renegotiation" of contracts in existence at the date of the act. Part of subsection (c) provides that if "in his opinion excessive profits have been realized, or are likely to be realized," the head of department may require the contract price to be renegotiated, and then says: "This subsection shall be applicable **** to all contracts and subcontracts heretofore made, whether or not such contracts or subcontracts contain a renegotiation or recapture clause, provided that final payment pursuant to such contract or subcontract has not been made prior to the date of enactment of this act."

This would seem to be contrary to the hitherto very well-settled rules of law prevailing for many years that contracts lawfully made cannot be amended by *legislative* action, but only by *agreement* of the parties, and that rights acquired under legally made contracts can not be abrogated or taken away, except on the basis of a just settlement or agreement by the parties. The case of *United States* v. *Bethlehem Steel Company* (315 U.S. 289) is the most recent of many authoritative decisions that have fixed the settled rules with respect to the finality of contracts once legally made and perfected.

If it should happen, therefore, that any executive department or independent establishment of the government, by virtue of this act or otherwise, should attempt a "renegotiation" of a contract made *before* the date of the act, or to determine that the price fixed by such contract was or is excessive and is to be discharged

by a payment less than the price agreed, the contractor will be well advised to refuse to abide by such decision, insist on his contract rights, and accept nothing less than what is in accord therewith.

Of course, if by *mistake* or otherwise, a contract duly made, gives the contractor a price *higher* than is fair, or a profit greater than is reasonable, and the contractor should be agreeable to changing the *unfair* price to what is *fair*, that should be done. This is by way of stating that dealings with the government, as with others, should be maintained on a fair and just plane, regardless of any errors on the part of either.

Contracts made since April 28

The act provides and directs that in all contracts (by the War Department, the Navy Department and the Maritime Commission) in excess of $100,000, made after the date of the act, there shall be included a provision "for a renegotiation of the contract price," at a time not stated, but presumably after the performance of the contract is completed, "when in the judgment of the secretary the profits can be determined with reasonable certainty." It may be said here, if such a provision is inserted and the parties agree thereto, it, like other valid terms, can be enforced.

What is "renegotiation?"

The term "renegotiation" is defined in subsection (a) of the act to "include the refixing by the secretary of the department of the contract price." Is a "renegotiation," as thus defined, namely, a "refixing" of the contract price by *one* of the parties, without any agreement by the *other*, an exercise of valid legislative authority? It has always been understood that the words "negotiate" or "renegotiate" mean that two parties having some difference of view would sit down together, each stating his view, and on the basis thereof *agree*. A "refixing" by *one* of the parties of the price previously agreed upon could not properly be classed as a "renegotiation." As apparently defined by the act, however, a new *agreement* would not be required. It would merely require the "*determination*" by *one* of the parties as to what the *other* was to do or accept. This would not, by any test of the law previously known, be a valid change in the contract.

There also arises the question as to whether the contractor is to have the right to a hearing and to present his views and contentions. No such right is expressly given by the act, yet the word "negotiation" would certainly imply such right. Even under the act, it is thought that there is such a right.

The act gives to the respective secretary wide authority and discretion, and provides that such authority "may be delegated, in whole or in part, by him to such individuals or agencies * * * as he may designate, and he may authorize such individuals or agencies to make further delegations of such authority and discretion." In other words, it is possible that under the authority of the act such important questions of fact as, what the work cost, how much did the contractor make, and whether that was reasonable, might, by delegation, be left for the determination of some subsection chief with no special information or qualifications for such a task. It is thought that this provision is unsound in law and in principle, and, if unreasonable re-delegation of authority should occur, may not stand a test before the courts.

The contractor's duty

If a contractor signs a contract containing a provision requiring him to "renegotiate" the contract price fixed in the contract, when such a "renegotiation" is proposed, what must he do?

He has *agreed* to such "renegotiation." It is a part of his contract that such "renegotiation" may be had. Therefore, he is by contract obliged to proceed with such "renegotiation." Whether the "determination" by one of the secretaries resulting from a misnamed "renegotiation" is to be accepted, or must be accepted, by the contractor would depend on a number of factors. Was the "redetermination" fair and reasonable? If not, the contractor may properly reject it and decline to accept, standing on his rights under the original contract. In other words, did such "redetermination" take into account the actual facts and actual factors of cost, and arrive at a conclusion based on such facts and factors? If not, such "determination" may fall into the class of arbitrary and unreasonable decisions which the courts will not enforce, and, if so, may be disregarded by the affected contractor or subcontractor.

One of the secretaries may, under the supposed authority of the act, attempt to collect what has allegedly been a payment of excessive profits, if payment under the original contract has been made. If final payment has not already been made, the secretary would, in such case, probably direct a withholding from the contractor, from moneys otherwise due him, of the amount "determined" by him as representing excessive price. In either case, it would be for the contractor to present timely protests against such charge or withholdings, and make prompt demand for the payment of the full contract price. If not paid as claimed, a suit in the Court of Claims for the balance would be the only remedy.

Summary

We have not discussed the constitutionality of any of the provisions involved. It is very probable that some of the provisions eventually may be held invalid, but on the assumption that the act is valid, we may summarize our conclusions as follows:

(1) On contracts made *prior* to April 28, 1942, under which final payments were made before that date, there is no provision for "renegotiation." Any attempt to "renegotiate" should be declined.

(2) On contracts made *before* April 28, 1942, but under which final payments were not made until *after* that date, the act purports to authorize "renegotiation." We have advised contractors not to accede to that and to protest any such "renegotiation" unless, indeed, the contracts involved were in terms which in fairness called for an adjustment.

(3) If any attempted one-sided "determination" is made by one of the officials designated in the act or by their subordinates, in either of the cases covered by (1) and (2), timely protest should be made. If the "determination" is by a subordinate, appeal to the secretary directly concerned should be made.

(4) On contracts made *after* April 28, 1942, in the required amount, the contract itself and the act direct the contractor to enter into "renegotiation." We think the spirit and intent of the act is that there shall be a fair "renegotiation," and that failing to have such, the contractor should protest, and unless thoroughly satisfied with the "determination," should decline to accept the same.

Machine Welding Speeds Liberty Ships

***Contents in Brief**—Building ships at an East Coast yard, is planned around the use of automatic electric welding machines that turn out about five times the production of manually operated equipment. Since the automatic machines work satisfactorily only on surfaces that are approximately level, normal techniques of ship construction required modification. For example, a side-shell assembly is welded and the frames attached in a horizontal position, then the large sub-assembly is swung into place with cranes.*

STANDARD 10,500-ton cargo vessels of the Liberty (EC-2) class are being produced rapidly at one newly constructed shipyard by the use of automatic welding machines to replace the slower manual units ordinarily used. The machines make a uniform, inclusion-free weld many times faster than hand welding. The time required to complete sections of the ships has been reduced to a small fraction of that formerly needed. The management of the North Carolina Shipbuilding Co. realized from the beginning of the yard the productive advantages of this welding method, and have adopted its use wherever possible.

Like all shipyards, this one has had difficulty in securing sufficient personnel for welding operations. Machine welding has been the answer to this problem, as the same workmen will do many times more welding that can be done manually. As much as 500 lin.ft. of butt or fillet welding has been done in ten hours with a machine compared to about 40 to 50 ft. for the manual operation. The time to weld stiffeners on transverse bulkheads has been cut to a third when machines supplement the manually operated tools on the work.

Introduction of the welding machine to shipbuilding also has brought many changes in erection sequence and technique. The machine can be used satisfactorily only on flat work or on slightly inclined sections. Therefore, the individual plate assembly method has been supplanted by sub-assembly fabrication.

Partitions, decks, side-shells, entire transverse bulkheads, large portions of the inner-bottoms, and bow and stern assemblies are built on large platens or platforms where machines can operate. These sections vary in weight and size; some of them are 50 ft. long by 25 ft. wide and weigh up to 40 tons. Larger sub-assemblies would be fabricated but for the limiting 25-ton capacity of the gantry-mounted, full-revolving cranes available in the yard.

Like the manual operation, welding by machine utilizes the heat generated by electric current passing from an electrode to the metal. The electrode is copper coated and is constantly covered with a granulated welding flux that fuses over the molten welding puddle to prevent contact between it and the air, not unlike the coating of a manual electrode. Traveling under its own power, the machine continually feeds electrodes and welding flux. The arc is always preceded by the flux, completely eliminating an open flow arc, all sparks, smoke and flash. Operators need not wear helmets or protective clothing and no flash is incurred to injure nearby workmen.

When the machine is in operation the only visual indications are the feeding of the electrode to the welding head and the travel of the carriage that supports it. Welding voltage, current, electrode speed and travel speed are regulated electrically. Control of the weld is maintained by varying any or all of these factors.

The welding machines and the necessary transformers are housed in compact cages that facilitate their movement from one part of the yard to another as production peaks shift.

Crane service is too valuable to tie up by moving sub-assemblies to the machines when the reverse operation is possible in a fraction of the time. This yard has 23 welding machines in operation to cover work on eleven assembly platens, five side-shell skids and nine shipways. These machines weld everything except vertical or overhead work, whether it is in the yard or on the hulls.

About three-fourths of the butt welds, covering the plates from $\frac{1}{4}$ to $\frac{3}{4}$ in. thick, that are welded by machine at this yard are welded in two passes, one on each side of the joint. The other one-fourth of the welds are made by machine on one side of the plate and manually welded on the other.

No bevels required

Plates are butt welded with no bevel required for thickness from $\frac{1}{4}$ in. to $\frac{3}{4}$ in. Fillets are welded with a simple attachment developed at Wilmington that eliminates the necessity for expensive and intricate tilting arrangements often used for other than horizontal welding with machines.

Joints tightly butted together are no longer necessary and on $\frac{3}{4}$-in. plates openings of $\frac{1}{8}$ in. are required and as much of an opening as $\frac{3}{16}$ in. can be permitted. Preparing seams in a shipyard so they will butt tightly is time-consuming and expensive. Such added operations are entirely eliminated by the use of machine welding.

Where manual welding is employed the difficult task is overhead welding and it is reduced by planning the operations to do as much as possible of such work as a sub-assembly with the pieces held in more convenient position. The machine welding process demands even more attention to sub-assembly welding to get the most from the much faster machine operation. Welds on the vertical plates of the ship, which can be satisfactorily made in placed-by-hand methods, cannot be undertaken with the machines so the side-shell assembly is done with the plates laid out flat on top of the frame.

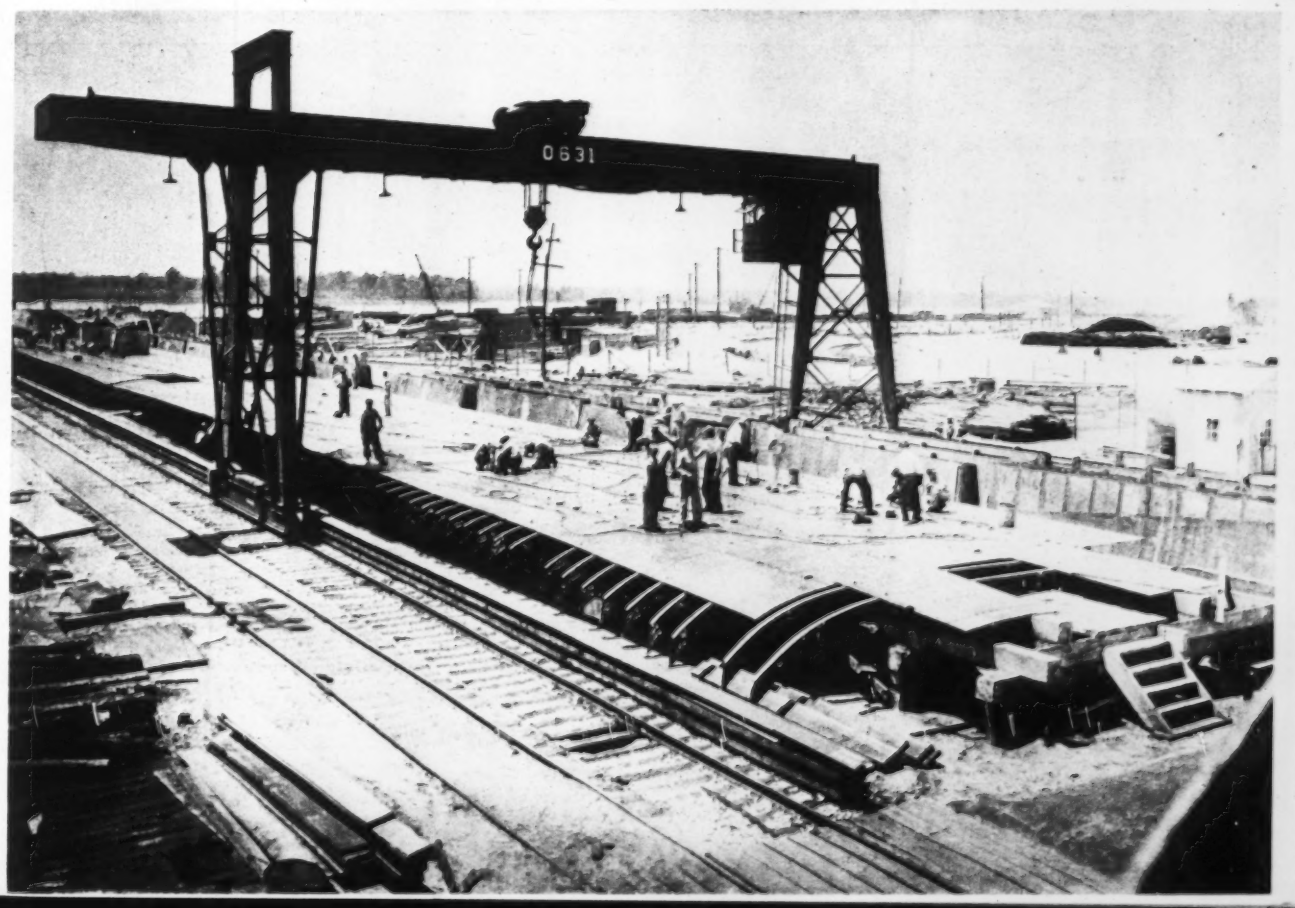
The practice in a shipyard using welding machines is to fabricate sub-assemblies in an upside-down position. Butts and seams on the flat plates are welded, the stiffening members laid and welded, the entire assembly turned right side up, and the butts and seams finished welded. In some cases where operating space is inadequate hand welders are necessary, but in many instances complete sub-assembly is done by machine.

About 90 percent of the side-shell is being sub-assembled and all of this portion is finished-welded by machine with an enormous saving in welders' man-hours of time. The side-shell is assembled first by laying the frame on a nearly level skid where the members of the frame are held rigidly in position for the side plates to be placed over them. These plates are bolted to the frames and butted together, and the joints are welded by the machines while the plates are in this horizontal position. The size of such sub-assemblies is limited only by the capacity of the cranes for transferring them into the hull.

The shell-plates are welded together before being riveted to the frames to permit the distortion and creep of the plates to take place freely without causing stresses in the frame. Closing sections of the plates are cut on the assembly platform to assure a perfect fit and they are then riveted to the frames. Rivets are mostly $\frac{7}{8}$ in. in diameter and the heads are countersunk and flattened to not more than $\frac{1}{16}$ in. outside the plates.

The after and forward-body shell of the ship is assembled in the same way as the main body except that the welding machines are not adaptable because the curved surfaces do not permit easy operation of the equip-

Fig. 2. Side-shell for the Liberty freighters is assembled in horizontal position and welded by automatic machines.



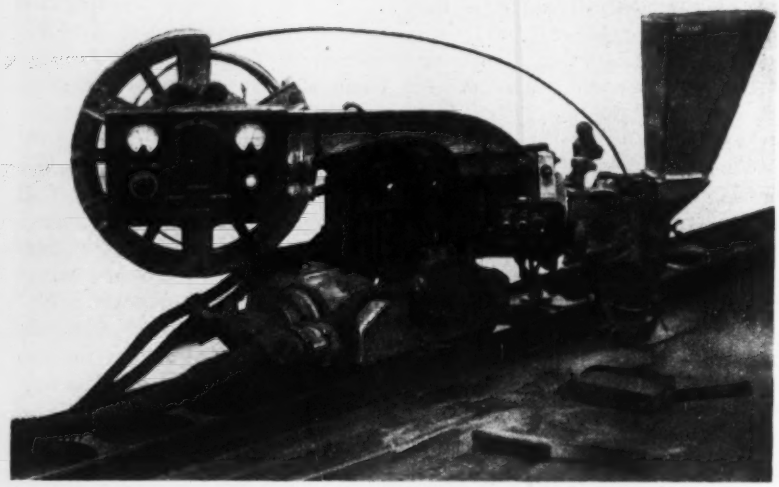


Fig. 3. Close-up of a welding machine, the speed of which is automatically controlled as it follows the guides. Note the smoothness of the 5/16-in. wide finished weld behind the machine.

ment. The falsework and template for the forward-body assembly is shown in Fig. 5. Note that the slots for the frames are canted to keep the frames at right angles to the longitudinal center line of the ship.

Meanwhile, inner or tank-bottoms, bulkheads, cargo hatches and other parts of the ships are being welded into units on assembly platens. The inner-bottom plating is assembled in an upside-down position, vertical stiffener members (known as floors to the shipbuilding fraternity) are welded to the plates manually, the unit is turned right side up and the inner-bottom plating is finish butt-welded by machine. On another platen the plates for the bulkheads are laid flat and machine welded. Then stiffeners are tack welded in position and welding machines, traveling 21 in. per minute, are used to weld the fillets. (See illustration top of page 76.) No tracks are required for this welder since one wheel is turned to hold the machine against the vertical member.

Preparation of the plates and shapes is also done with automatic machines. The fabrication of plates is speeded by use of specially templates and semi-automatic, propane cutting machines. The templates intended for continued use in the fabrication shop have metal edges and are used with a magnetic guide wheel on a pantograph to assure true shapes. The pantograph is used with multiplex blowpipes (Fig. 5) to cut several plates of the same shape at one time.

Bending, punching, and a large portion of the layout and cutting to size of parts are handled in two large fabrication buildings. Additional outside skids (work platforms that are skeleton framing without a deck) are provided for the rest of the necessary layout and cutting. After the materials are fabricated, they are moved to a particular point in the yard assigned to assembly of one certain section of the hull. One crew thus fabricates and does the sub-assembly on one portion of all the hulls.

Platens for assembly of the bulkheads and many other parts of the ship are flat steel plate. On this plate the molds, or lines, for the sections are laid out with punch marks on the exact lines of the pieces so that the wood templates need not be used for each layout. This method saves considerable time on marking out the pieces and reduces the cost and maintenance of templates to a fraction of that usually required.

The ships are assembled on con-

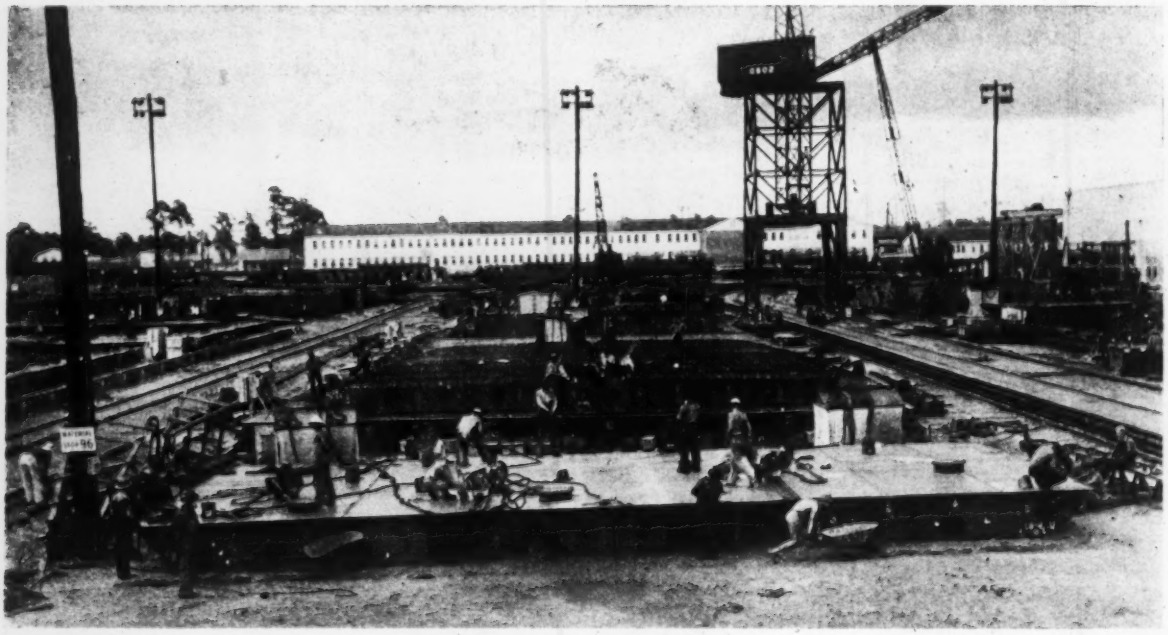


Fig. 4. Inner-bottom assembly. Machine welders make final pass to weld plate joints. Transformers for welders are housed in the frames just back of the section in foreground.

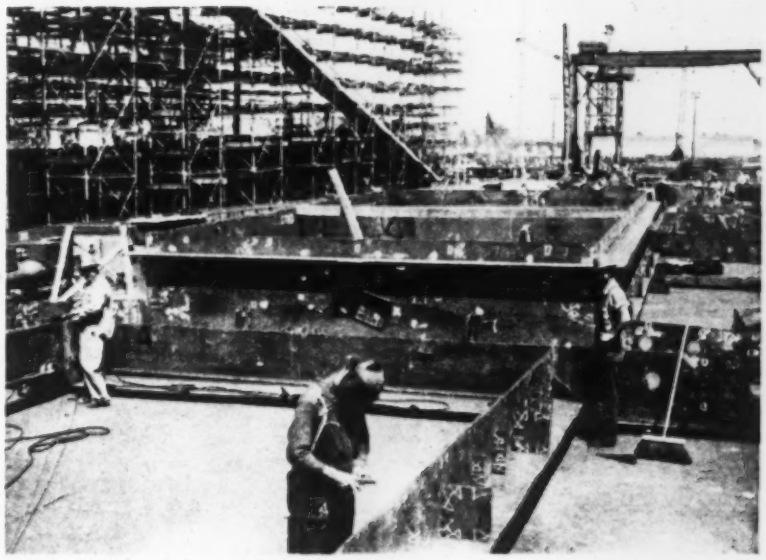
ventional launching ways. First the bottom plates are laid out on falsework without sub-assembly and are butt-welded by machine prior to placement of the pre-assembled parts in the hull. Inner-bottom sub-assemblies are then placed in the hull with bulkheads, side-shells, decks, cargo hatches and superstructure following in their proper sequence.

Welding techniques are being changed; new and different uses of the machines are constantly being found. The supervisors have searched and studied the yard and hulls several times to discover new ways and different means of using machine welders to save time of hand work. The effectiveness of the surveys is indicated by the rise in machine welding electrode consumed per ship. This has increased from 6,000 lb. on the first hull constructed to more than 10,000 lb. on recent work. Weekly consumption averages 8,500 lb. of electrode and is continually growing.

The original schedule for the yard was a boat every 18 days from the six ways but this has been cut to a freighter in an average of less than one week from the nine ways. The ships are usually well along to completion when launched, one requiring only 16 days at the outfitting pier from launching until it was turned over to the government.

The ships are being built by the North Carolina Shipbuilding Co. at a yard on the Atlantic Coast. This firm is a subsidiary of the Newport News Shipbuilding and Drydock Co., organized for construction of Liberty freighters. K. D. Fernstrom is general manager of the yard, with P. F. Halsey as works manager. W. E. Begor is welding engineer.

The U. S. Maritime Commission is represented on this work by M. C. Vendig, plant engineer; J. P. O'Connor, principal hull inspector; and Verne N. Drew, machinery inspector. Emory S. Land is chairman and H. L. Vickery vice-chairman of the Maritime Commission.



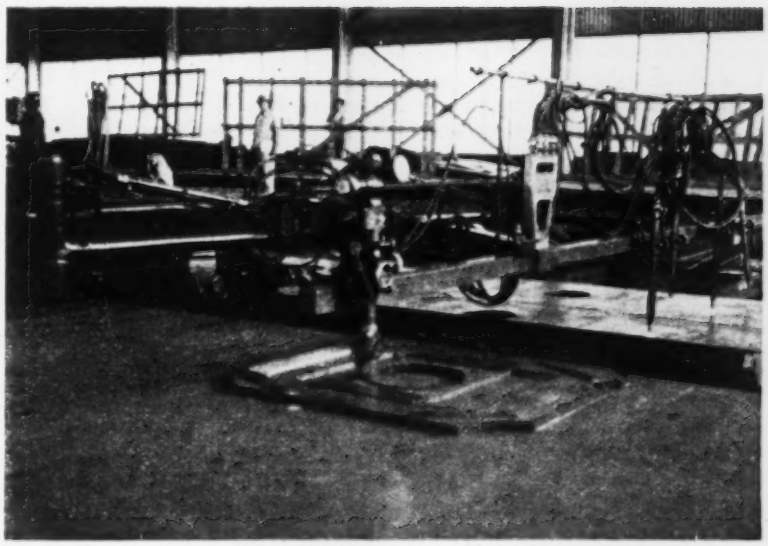


Fig. 5. (Top) Complete cargo hatches are assembled on platens and set on the deck as assembly progresses. (Center) Falsework for the forward body-shell assembly; frames of the ship fit into the slots. (Bottom) A multiple blowpipe automatic cutting machine with a pantograph arrangement in which a magnetic device follows the metal edge pattern in the foreground as flames cut the metal sheets.

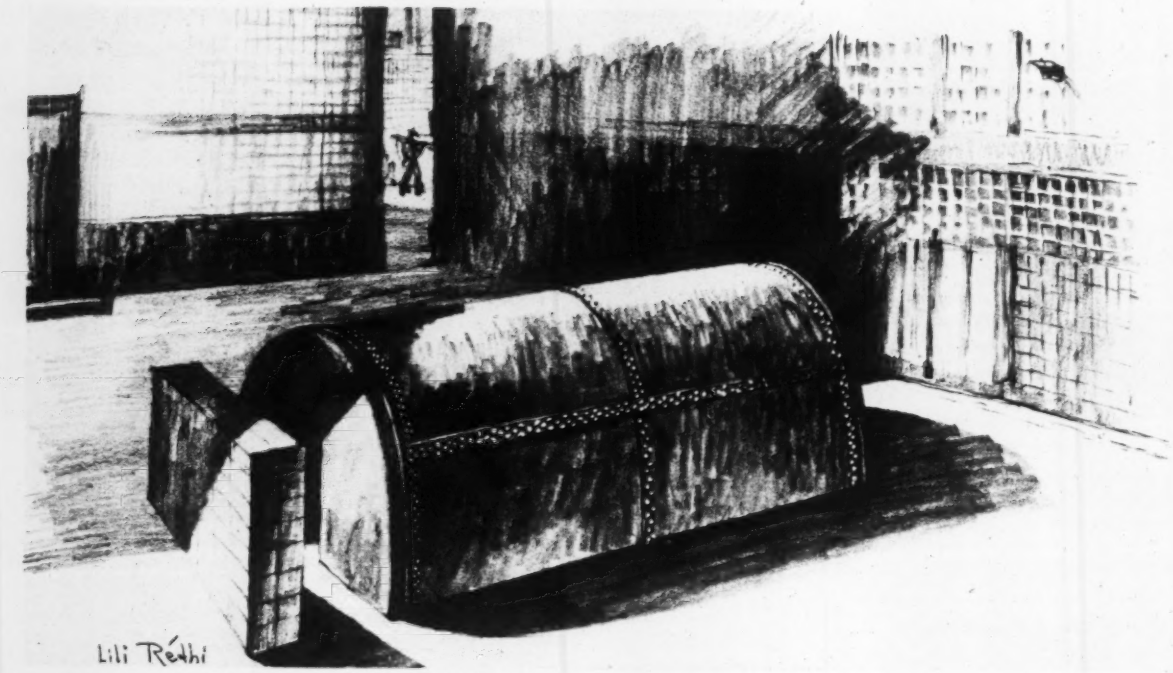


Fig. 1. Half of an old boiler affords an effective shelter. Blast wall should be of sufficient width and close to door opening.

Air-Raid Shelters for Factory Yards

***Contents in Brief**—Navy Yard practice suggests use of small shelters, set on top of ground, close to working areas. Any improvised enclosure that will protect against blast, fragmentation and machine gun fire is satisfactory. Most advanced design at present uses walls of concrete block and a concrete slab for floor and roof, all three elements tied together with continuous reinforcing.*

WITH the U. S. war declaration last December, vital naval establishments undertook immediate strengthening of their defenses. One important element of the work was the provision of more air-raid shelters for the working personnel, and both the governing philosphy of the designs and the various types of shelters that resulted are of interest to engineers in industrial plants who may be faced with the same situation.

The philosophy of the designs embraced three main points: (1) to provide a relatively large number of small shelters; (2) only to build them strong enough to resist bomb fragmentation, falling shrapnel and machine gun bullets; and (3) to disperse the shelters, relative to one another, but to place them as close to the work areas as possible so that they can be reached quickly and so that lost working time will be but a minimum.

What might be termed a fourth point of design philosophy, at least for the early shelters, was to build them of anything that was ready at hand. For example, two of the most effective shelters were made by cutting an old Scotch boiler along the longitudinal center line, giving arch-shaped structures of 1-in. thick steel plate; blast walls in front of the entrance were made of precast concrete blocks filled with sand.

A second type emergency shelter had walls of precast concrete block and a roof consisting of a steel plate weighted down with sandbags. A variation of this type used heavy timbers instead of steel plates for the roof. This design might also be varied by using blocks made from sand or gravel stabilized with asphalt. Walls of such blocks are being used as splinter protections for equipment and buildings at some locations. They eliminate the burlap bags required for a sandbag wall and have proved to be stable and weather resistant. Another type of air-raid shelter was improvised from curved steel plate assemblies stored in the yard for repair of battleships; such assemblies would not of course be available in an industrial plant but their use suggests that various types of fabricating parts can be made to serve as a suitable temporary shelter.

Concrete block shelter

In general, the sand-filled concrete block shelter has proved to be the most practical, considering that it may be built quickly, has substantial weight, and is composed of materials that are relatively cheap and readily available. No reinforcement was used in the first concrete block shelters, but later ones have incorporated rods which are made continuous from the bottom of one wall, across the roof and down the other wall. In these instances the roof consists of a 4-in. concrete slab. In the walls, the cells

of the concrete blocks containing the rods are filled with concrete; as before, the remaining cells are filled with sand. The latest shelter of this type also utilizes a concrete floor slab; in this case the rods are continuous around the structure forming a closed rigid frame.

The majority of shelters are about 10 ft. square and only 5 ft. high. The wall thickness is 16 in. made up of two rows of 8x8x14-in. blocks. If a greater thickness is desired, the two rows of blocks can be separated and the space between filled with sand. In such an arrangement the ends must, of course, be closed with blocks to hold the sand, and the top should be covered with mortar to keep the sand from blowing or from becoming saturated during rains. This type of construction may also be used as a blast wall in front of the lower story windows of a building.

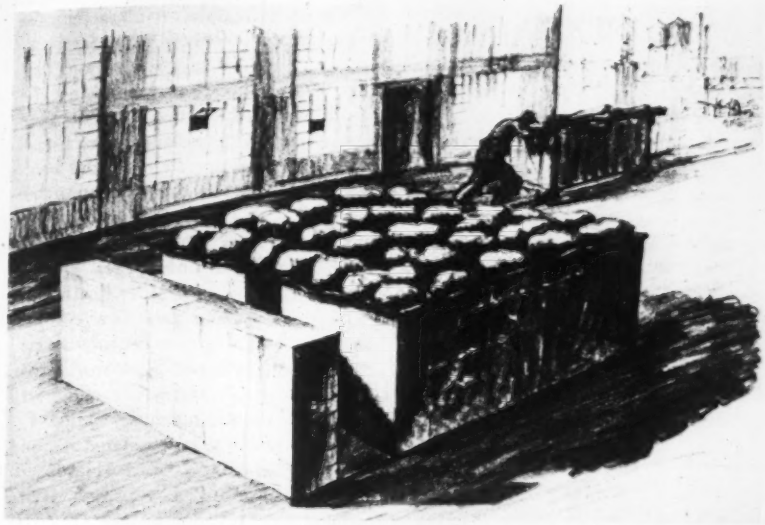


Fig. 2. Hastily assembled shelter of concrete block walls roofed with old steel plates weighted down with sandbags. Timber could be substituted for the steel plates without great reduction in safety from bomb splinters.

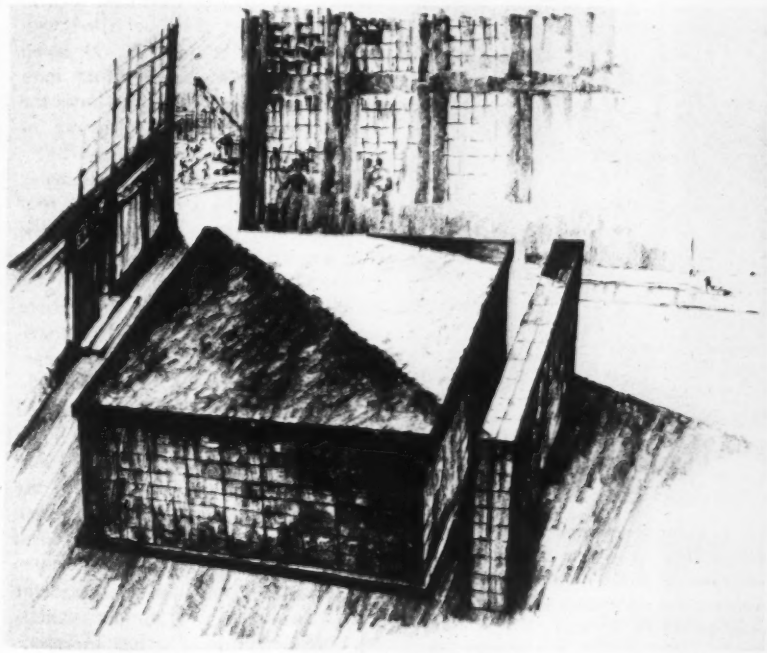


Fig. 3. More permanent type of concrete block shelter uses concrete slabs for floor and roof. Reinforcing is continuous over roof, down walls and across floor.

A significant element in the design of the shelters is to make the door as narrow as possible, probably 18 in., and to protect the entrance by a blast wall placed not over 2 ft. from the shelter. The blast wall is also of concrete block construction and extends across the full width of the structure.

A type of protection devised for equipment installations might also be used for shelter walls. It consists of gravel-filled cribs of railroad ties wired together into a structure about 4 ft. wide at the base and battered slightly on both faces. Such a barrier, it is believed, would provide certain protection against anything but a direct hit.

All of these shelters are built directly on the ground, which eliminates any foundation excavation, provides freedom from drainage problems, and makes them less liable to damage from ground shocks.

United States Steel Output Exceeds That of Axis

Steel production in the United States greatly exceeds the combined capacities of the Axis powers according to a September 10 report by David F. Austin, acting chief of the iron and steel branch of the War Production Board.

The United States produced 82,927,557 ingot tons last year and is expected to produce more than 86,000,000 tons in 1942. Axis steel production, including that of the European countries under German control, was about 74,000,000 ingot tons in 1941 and that total cannot be increased sufficiently this year to equal the output of American plants.

Over 75 percent of the steel now produced in the United States is for direct war use and the remainder is for essential industries such as railroads, manufacture of machine tools, and other industries playing an important part in the war. Of the 86,000,000-ton total expected this year, 62,000,000 tons, or about 70 percent, will be delivered as structural shapes, pipe, wire, rails and the like. The remaining 30 percent will go back into the furnaces in the form of scrap.

Steel-making capacity in the United States has been increased during past years and will continue to increase during the next few years. At the end of 1939 the ingot capacity in million tons was 81, at the end of 1940 it totaled 84.

Controlled Reduction of Road Oil To 100-Penetration Consistency

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Highway Department Laboratory
Minnesota Department of Highways, Saint Paul

MOST users of asphaltic road oil will agree that a great variety of materials may be obtained under the ordinary road oil specification. Under these conditions it becomes questionable whether the material best suited for a particular purpose always is obtained. This situation resulted in considerable difficulty for the Minnesota Department of Highways during the 1941 construction season. Slow curing oils were being used in the construction of temporary mats from pit-run gravel, which often was deficient in fines. With most road oils this procedure has produced excellent results, but in the case of very slow-setting road oils a great deal of difficulty has been encountered through raveling and loss of material soon after construction.

A study of road oils used in 1941 indicated that the time of reduction to 100 penetration gave a good indication of the rate of setting of that material on the road. Admittedly, the conditions of the test differ widely from field-curing conditions, and for this reason studies are being carried out using other methods of reduction. For example, a 5-gram sample spread in a 1/20-in. film on a 6-oz. can cover is heated in the standard oven for five hours at 325 deg. F. The softening point of the residue obtained from various road oils subjected to this test has varied from 59 to 159 deg. F.

In standardizing a procedure for time of reduction, A.S.T.M. Method D243-28T was followed with some revisions. This method was employed because the greater exposed area in the hemispherical dish permits a much more rapid reduction. A second advantage results from the fact that the sheet-metal flask heater is more sensitive to adjustments of the gas flame than is the cast-iron holder for Method D243-36.

It was found that reproducible results could be obtained for time of reduction provided the temperature was rigidly controlled. However, such control requires constant attention and this makes mass testing difficult. To overcome this difficulty, a gage was devised which accurately registers the flow of gas to the burner. The gage is shown in Fig. 1. In operation, the gas flows through a capillary tube (*B*) to which a U-tube gage (*F*) is attached. Since theoretically, the friction in the capillary is directly proportional to the velocity of the gas, and since the gage measures the drop in pressure across the capillary, within reasonable limits, the gage readings are proportional to the flow of gas.

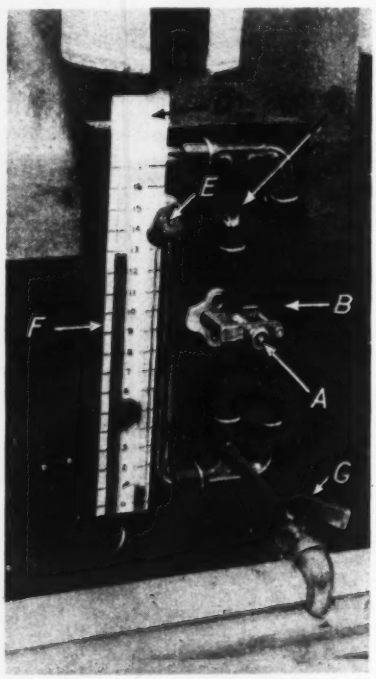


Fig. 1. Gage developed to register the rate of flow of gas to burners used in the tests. A is the control clamp, B the capillary tube through which gas regulated by valve G flows to the bunsen-burner outlet C. F is a U-tube gage which can be filled with colored water at E. D is an adjustable scale.

The specification requires that the sample shall be heated up to temperature in from 10 to 15 min. and that this heating-up period shall not be included in the time of reduction. The gage has been found very useful in controlling the time of the heating-up period. In this operation the valve *G* is opened wide and the bypass, controlled by the clamp *A*, is used to provide the larger volume of gas needed for the heating-up period. By experience, the proper gage reading for the heating-up period is determined. This reading is obtained by adjusting the clamp *A*. When the sample reaches 460 deg. F., the gage reading is regulated by adjusting value (*G*) with clamp *A* completely closed. The proper reading for maintaining a constant temperature of 490 deg. F. is found by experience. This reading varies only slightly for different samples. The outlet to the bunsen burner is located at *C*. The gage may be filled with colored water at inlet *E*; *D* is an adjustable wood scale sliding in a slot in the support. Fig. 2 shows the complete assembly for a group of six heaters.

In order to check what consistency in results might be obtained, four samples were run in triplicate, the test conditions being controlled as accurately as possible. Each of the groups of three samples was heated for an identical period, and comparisons were made on the basis of penetration and percent of residue obtained. These results are contained in the accompanying table.

The results shown indicate very satisfactory checks, except in the case of one sample of 4203, which had a penetration of 127. A fourth sample of this material was then tested, and it may be seen that the three results agree almost exactly as to penetration. Further investigation disclosed that the thermometer used in the sample testing 127 pene-

tration read 3 deg. too high. Moreover, it was found that in every instance in which this thermometer had been used the penetration was higher than that of the check samples. This emphasizes the need for using the specified thermometer for the test.

RESULTS OF CHECKS ON THE CONSISTENCY OF METHOD FOR CHECKING RATE OF CURING OF ROAD OILS

Sample No.	Reduction Time in Minutes	Penetration 77 deg. F.	Percent of Residue
4203	66	99	75.7
4203	66	127	77.1
4203	66	98	75.6
4203	66	102	75.9
4205	33	103	87.6
4205	33	92	86.8
4205	33	93	86.9
4211	292	104	74.9
4211	292	103	74.3
4211	292	93	73.6
41252	513	94	79.4
41252*	513	89	79.3
41252	513	84	79.1

We find that with this system of regulation the gas will require no adjustment for hours at a time. When adjustment is required, the gage provides an accurate guide for regulating the gas valve. We find that when using a capillary .056 in. in diameter and 2¼ in. in length a gage reading of about 11 cm. produces a constant temperature close to 490 deg. F. This reading represents a flow of about 1.8 cu.ft. of gas per hour. The gas used has a B.T.U. content of 800 per cubic foot and thus about 24 B.T.U. per minute are required to maintain the constant temperature specified.

The time of reduction in the hemispheres is about one-third of the time required in the 6-oz. cans. Since the exposed area in the case of the hemispheres is only double that in the case of the 6-oz. cans, some other factor must operate to speed up the reduction in the hemispheres. Thinking that the greater speed of reduction might be related to temperature differences at different parts of the sample, thermocouple readings were made. The thermometer location (⅛ inch above the bottom) was taken as the standard for making comparisons. The temperature at the bottom was 16 deg. above that at the thermometer location in the case of the hemispheres and 25 deg. above in the case of the 6-oz. can. The surface temperature was 35 deg. below that at the thermometer location in each case. Thus the greater speed of reduction in the case of the hemispheres does not mean that the temperature conditions are more severe. The effect of the tin coating of the 6-oz. cans upon reduction time was also studied. In the particular instances studied, the tin was found to have no effect.

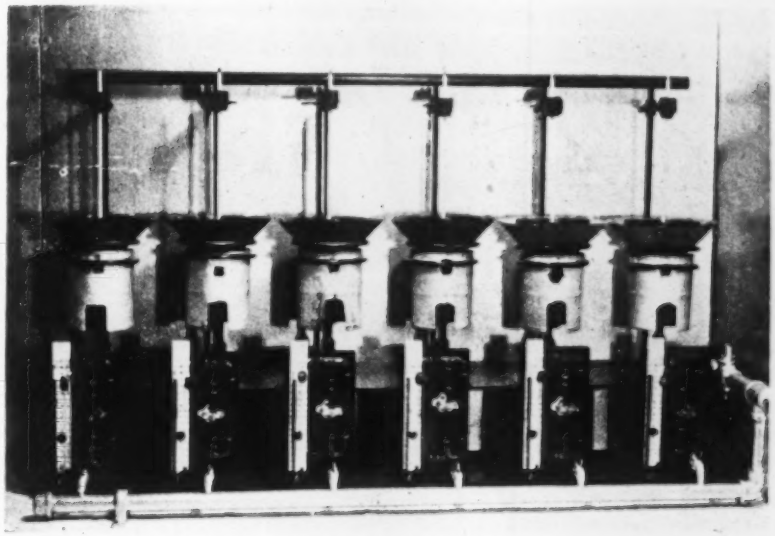


Fig. 2. Complete assembly of burners used in the tests. Each is equipped with a gage shown in Fig. 1.

Filter Clogging and Odor Controlled With Chemicals

A NEW PROBLEM, and its solution, in filter clogging and water odor at Hillsboro, Ill., is described by Fred A. Roemelin, superintendent of water works, in *Over the Spillway*, official bulletin of the Illinois State Department of Public Health. With some abbreviations, his account is substantially as follows.

The source of supply is an impounding reservoir, and we encounter the usual taste and odor problems expected from a surface supply. But on May 28, 1941, we noticed that the length of filter runs was being reduced very fast; examination disclosed that the top of the filter beds were very hard. On May 29, we took a sample of raw water from the intake, and according to the analysis by the State Department of Health: "The microscopic examination showed the presence of 400 *Ceratium* per ml. (6,000 sq. standard units). This sample also contained green algae. *Hermidium* being present in amounts of 30 sq. standard units per one ml."

Ceratium is a protozoan reported as responsible for disagreeable or fishy odors in water supplies. Our raw water had a very fishy odor, and when we washed the settling basins the odor was terrific. Immediately we sought a means of control.

Our first step was to treat the lake with copper sulphate, but as the usual dose had no effect on the *Ceratium* we increased the dose to 5 lb. per million gallons. As the lake capacity is 600,000,000 gal. and water is brought a long distance to the plant through a 14-in. main, it took time to notice the results, and meanwhile the filter runs kept decreasing until we could get only one-hour runs. The lake had no turbidity, so we had to make a floc with chemicals. As we pre- and post-chlorinated, we just increased our chemicals to a final dose of 5 ppm. residual chlorine in the raw water, with a residual of 0.35 to 0.5 ppm. in the finished water.

We also used five grains of alum, five of lime and five of activated carbon per gallon, and got splendid results. While waiting for results from the lake treatment we used copper sulphate in the mixing chamber at the rate of 5 to 8 lb. per million gallons. From this we learned that the odor caused by *Ceratium* can be controlled by the application of activated carbon, with pre-chlorination.

Materials Handling for Santa Fe Dam

***Contents in Brief**—Grading and moving the 12,000,000 cu.yd. of fill material going into the several zones of Santa Fe Dam on the San Gabriel River in southern California called for very careful planning if costs were to be kept within reasonable limits. Methods used in handling the fill material are given, special attention being devoted to the design of grizzlies used in segregating the coarse fill materials.*

NOW ACTIVELY under construction on the San Gabriel River about 30 miles northeast of Los Angeles is the 12,000,000-cu.yd. earth and rockfill that is to form Santa Fe Dam, largest dam being built to control floods in the Los Angeles area. A secondary function of the dam is to retain flood waters for release at a rate calculated to replenish the underground water storage to best advantage. The dam is built on a deep, delta-cone deposit near the mouth of San Gabriel canyon, from which floods in centuries past have carried out great quantities of the coarse materials that comprise the delta cone. Practically all clay and other fines have been washed out of the cone material leaving a coarse gravel with a considerable percentage above the 6-in. size. Absence of any solid foundation (within economic depth), lack of fines in materials near at hand, and a tendency of the stream to change its course over the delta cone where the dam is located—making a very long dam desirable—indicated that it would be difficult to build the desired structure at low cost. Means have been found, however, for solving the problems presented by these conditions. They center chiefly in methods for transporting, segregating, placing and compacting the large quantity of materials that constitute the major portion of the structure. Because of the large quantities of gravel to be graded, the job presents a rare opportunity for studying the operation of grizzlies in that work.

The dam is being built by the U. S. Engineer Department under contract. At the site selected a crest length of 23,805 ft. is required to span the limits of possible changes in river channel and at the same time to form a reservoir of adequate capacity. (See Fig. 1.) In plan the dam is shaped like a wide, irregular "U" with practically all of the reservoir area included between the two arms. A concrete outlet structure is being built at the center or highest portion and a spillway is located on the right bank near the end of the right arm. Construction of spillway and outlet works is being done by usual methods, hence that work is not discussed in detail.

The stream control plan calls for building the dam in two parts. The centrally located outlet structure and all that portion of the dam toward the left bank will be built first behind protective dikes. The outlet structure was to have been used for stream flow while the right half was built. Delay in arrival of steel reinforcing may make it desirable to start on the

right half before the outlet works is completed. However, an opening or gap in the central portion of the dam may be left to be filled in later as a final step.

Materials from two sources

The entire debris cone, extending for miles in all directions from the dam, is uniformly coarse material entirely lacking in fines. Curiously enough, however, a very large deposit of excellent material for the impervious core was found in the foothills, on steeply sloping ground where fines ordinarily would not be expected. From this source, known as Borrowpit A, 4½ miles from the dam, will come all of the 1,000,000 cu.yd., roughly, needed in Zone 1, the impervious core.

All the materials for the more porous zones (2, 3, 4 and 5) are being taken from Borrowpit B immediately adjoining the dam on the upstream side. Here two electrically operated shovels with buckets of 4 and 6-cu.yd. capacities, respectively, excavate and load the material.

With a 90-deg. swing from the digging position, the average dipper cycle is less than one minute; four dipper loads totaling 16 to 25 cu.yd. are delivered to the truck in three to four minutes. The average output of these two shovels has been running about 7,000 cu.yd. per eight-hour shift.

Roads of the highest quality are maintained, both from Pit B, whence delivery to the fill averages about 5,000 ft., and from Pit A, 4½ miles away. All of the materials used in the dam are suitable for highway fills and surfacing. Because of the preponderance of porous material, the roads have notably good drainage and smooth hard surfaces free from mud over the entire job. Maximum upgrades are 2 percent except for some very short stretches in Pit B and on embankment ramps.

Grizzly operation

Practically all of the coarse material, something over 11,000,000 cu. yd., comes from the area immediately upstream from the dam where excavation increases the storage capacity of the reservoir. Excavation here is ranging in depth up to 40 ft. in remarkably uniform material, nearly all of which can be used on the dam. Segregation of this large quantity of Pit-B material into two grades, the plus-6 and minus-6-in. classifications, constitutes the center of interest on this job. The segregation is done by two grizzlies of different types, designed for (1) mechanical and (2) gravity delivery.

The mechanical grizzly elevates the pit-run material on a 60-in. rubber conveyor belt (275 ft. between pulleys, 200-hp. motor) from a loading station built below ground. The underground station allows trucks to discharge from ground level and a 72-in. pan feeder delivers the material uniformly to the conveyor. At the delivery end of the belt the material discharges on two heavy-duty stationary bar screens set at an angle of 28 deg. with the horizontal. The minus-6 material falls between the bars into the bunker beneath and the plus-6 passes over the tops of the bars into another bunker. Both bunkers are elevated enough to permit trucks delivering to the fill to drive, at ground level, beneath the discharge gates.

The second grizzly has no mechanical elevating equipment; the trucks drive up a 2 percent earthfill ramp (made wide to facilitate passing) to a level at which they can discharge directly onto the grizzly that separates the material into the two sizes. This gravity-feed delivery warrants special attention because the contractor

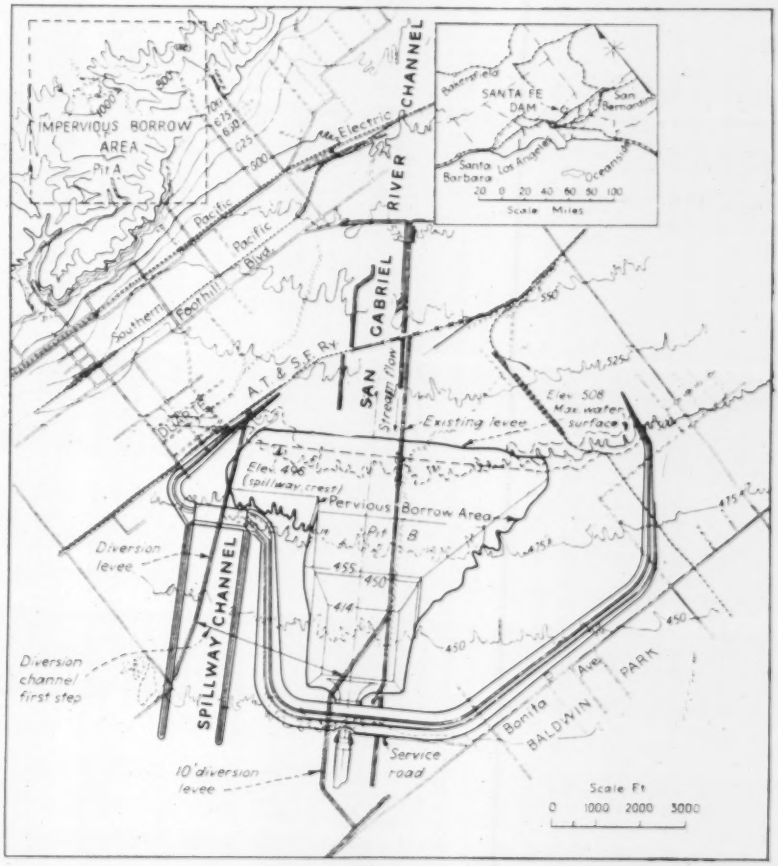


Fig. 1. Plan of the 12,000,000 cu. yd. earthfill dam for detention of flood waters of the San Gabriel River near Los Angeles. The storage capacity of the reservoir is being increased by taking the pervious borrow out of the central portion of the valley above the dam. Impervious borrow comes from the hills to the northwest.

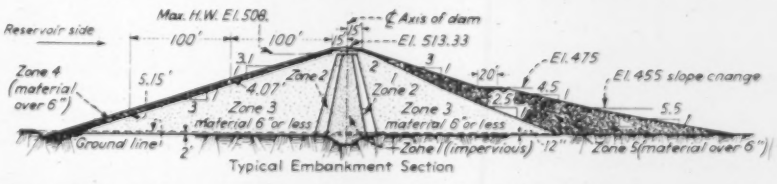


Fig. 2. Cross-section of the dam showing relative width of the five zones into which the pervious and impervious materials are divided.

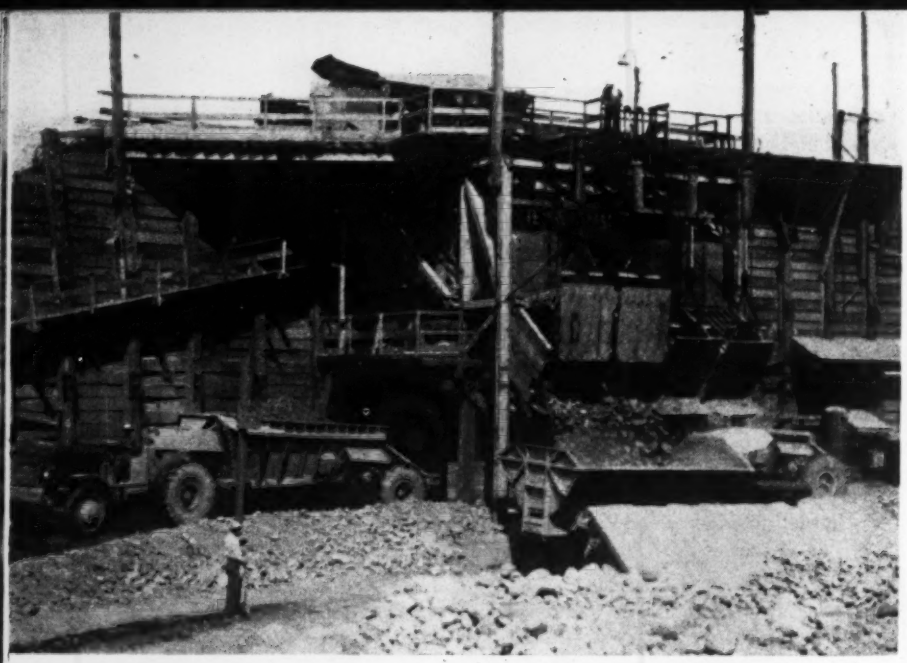


Fig. 3. Trucks dump pit-run material at upper level and gravity flow feeds the segregated materials to other trucks at the lower level.

has chosen this design as the one to be used in building the additional grizzlies which will later be required for the second half of the job. The reason for this choice is that although the mechanical grizzly capacity is greater and permits the trucks to discharge their loads and get away quicker, yet the risk of breakdown, cost of maintaining equipment, and difficulty in getting replacements, make it more desirable to use the gravity type.

The gravity grizzly has two flights of bar screens, each 8 ft. long. The bar spacings increase toward the lower ends (from 1¾ in. at the top to 5¾ in. at the bottom) to prevent rocks from wedging between the bars. Spaces between bar groupings are covered over with steel plates.

Experience thus far on this job suggests an improved arrangement of the bars in the grizzlies yet to be built. Instead of the 8-ft. length, a better arrangement, it is expected, will be twice the number made 4 ft. long and with separations ranging from 3¾ in. at the top to 5¾ in. at the bottom. This will afford more open space and correspondingly quicker escape of minus-6 materials through the bars. This arrangement, also, affords less blank space on the grizzly. Heavy chains, of the type used for ship anchors, that were put in as a curtain to prevent bounding rocks from jumping the barriers, have not been found necessary if the trucks are required to be in the proper position when they dump.

Improvement in design of the bunker gates for the plus-6 size is also planned. The gates now in use (6 ft. wide and 4 ft. high, operated by two 10-in. air rams working under 65 lb. per sq.in.) are the heavy "finger bar" type that are lowered from above into the closed position. This type works well only where the entire bin capacity is discharged for each opening as the outflowing stream prevents the gate from closing during the flow of material. On the new bunkers, combination gates will be used, employing fingers as well as the undercut principle, thus making it possible to stop the outflowing stream regardless of amount of material remaining in the bin.

Experience with this grizzly has indicated the need for larger bunker capacity. Storage for plus-6 material in the new grizzlies will be increased from 20 to 40 cu.yd. and for minus-6 from 30 to 45 cu.yd.

As at present operated, both grizzlies are in service 16 hours out of each 24. During the third 8-hour shift a repair crew, usually including a welder or two, inspects the equipment carefully and makes any needed replacements or repairs. Usually this includes more or less attention to the grizzly bars which are made up of old rails and mild steel plates, as shown in the accompanying drawing.

Truck types and assignments

Truck dispatching is managed so that insofar as possible units are kept at work where they are most efficient. Bottom-dumps are speediest on the fines, end-dumps are handy for stripping, and side-dumps get rid of their loads quickest in delivery to the grizzly. For example, a side-dump can be ready to leave the dumping platform in about four seconds after it begins to discharge. For an end-dump to back around into position and discharge, some 45 sec. is usually required.

Endeavor is made to assign trucks to the different operations so that material will arrive on the fill in a sequence that avoids interference in successive operations. Where the core material can be kept slightly above the level of the adjoining surfaces, the trucks have a rather uniform pull to point of delivery. Truck bodies of the

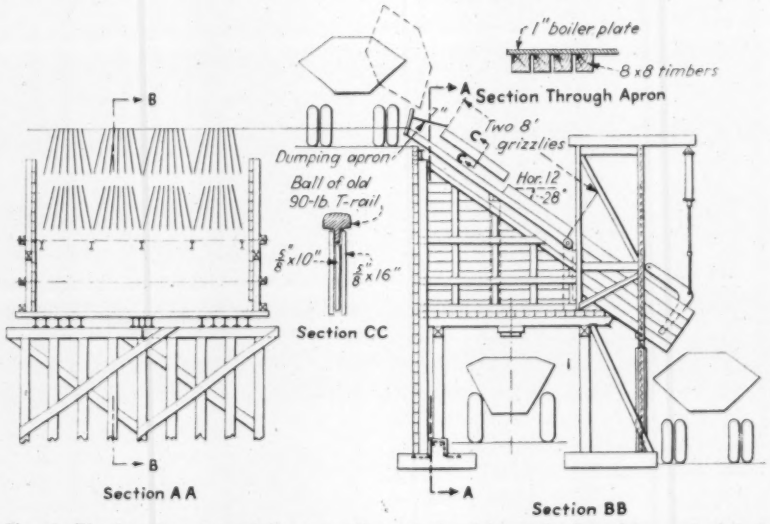


Fig. 4. The key to successful segregation of plus-6-in. and minus-6-in. materials is this gravity-feed grizzly with flared spacing of the bars. An improved design with four sets of 4-ft. long bars is now being developed.

center, bottom-dump type, are assigned to core material deliveries because the load can be dumped without slowing down truck speed. These trucks follow one another, each one straddling the windrow of fines left by the preceding trucks and each one lengthening the windrow by the amount of material it carries. Fines so deposited are spread with a blader to an average depth of 6 in. before tamping and sprinkling start. Ordinarily, eight passes of the sheepsfoot roller preceded by about two sprinklings and two harrowings are required. The harrow is always used after the sprinkler before the rolling is done.

Operations on the fill

Although Pit A produces fines of a remarkably uniform quality, there is a small percentage of cobbles. Thus, it has been desirable to keep a four-man crew of rock pickers on the fill where they walk along the newly placed core to toss out into the side zones any plus-4 rock that were left on top of the layer, or were worked out by the harrowing and rolling.

Material from Pit A does not show more than 7 or 8 percent of clay (some samples have been as low as 2 percent), but it has a combination of fines with disintegrated granite in such proportions that for 95 percent optimum compaction percolation tests show an average rate of only 0.002 ft. per day in the usual 1-sq.ft. test area under a 1-ft. head. The average of tests on the first 100,000 cu.yd. of material put into Zone 1 showed a weight of 132.4 lb. per cu.ft. (total range was from 120 to 140) and the density rating was 96.9 percent of optimum of maximum density.

This average density of 132.4 lb. per cu.ft. represents an addition of 23 lb. to the weight of the same material before excavation from Pit A. It there weighed 109 lb. per cu.ft. (All weight in these relative density figures are for dry material, the usual laboratory basis of comparisons.)

In the transition zones (Zone 2) on either side of Zone 1, care is taken on two counts: namely, to avoid very large cobbles that would be likely to get caught and remain between the feet of the sheepsfoot rollers and, second, to maintain a gradual rate of change in porosity from the impervious core material to the relatively porous material of Zone 3. This latter procedure is followed so that there will not be a sharply defined plane in which the rate of percolation changes so rapidly as to give rise to the risk of flushing out fines.

STATISTICAL DATA ON PRINCIPAL FEATURES

Length of dam at crest	23,805 ft
Maximum height of crest	92 ft.
Drainage area	231 sq. mi.
Reservoir capacity	47,200 acre-ft
Maximum spillway discharge	200,000 cu. ft. per second
Maximum outlet works discharge	37,400 cu. ft. per second
Excavation total (including stripping)	14,201,000 cu. yd.
Total volume of dam embankment	11,950,000 cu. yd.
Total concrete required	16,.,700 cu. yd.
Reinforcing steel required	11,500,000 lb.
Estimated construction time	830 days
Approximate date of completion	December 1943
Estimated cost of project (Exclusive of right of way)	
Contractors bid	$8,837,199.50
Material and supervision furnished by governm't	$1,593,670.24
Grand total	$10,430,869.74

In Zone 3 it was found that desired density could be obtained with material placed in 12-in. layers, flushed with 35 to 50 gal. of water per cubic yard, even when given no rolling other than that provided by the passage of equipment used on the work. Density in Zone 3 material has averaged 140 lb. per cu.ft. On the upstream side, where shear value is important in resisting any slide tendency resultant from sudden reservoir drawdown, unusually high shear values, ranging up to 44 deg., have been obtained.

Sprinkler trucks are supplied from a water line carried along the fill served by a 12,000-gal. tank mounted on skids so it can be moved as desired. The tank is equipped with a float-operated valve and remote control for a motor-driven pump which automatically replenishes the supply in the tank.

The Zone 5 material, that is, the plus-6 rock, of which a total 2,430,000 cu.yd. will be required, is delivered by the side-dump trucks which have heavily reinforced bodies well suited to withstand the battering of cobbles. In this zone it has been found possible to dump in the required position with only the aid of a bulldozer to clean up along the top of the fill after the trucks have dumped.

Contract for the dam is held by a combination of the following firms: Morrison-Knudson Co., Winston Bros. Co., J. F. Shea Co., and Ford J. Twaits Co., known locally as "MWST." The project manager is R. F. Rasey (representing the contractors), A. H. Johnson, general superintendent, and C. S. Bradley, project engineer.

For the U. S. Engineering Department, under whom the work is being carried out, Col. Edwin C. Kelton is district engineer at Los Angeles, and James G. Morgan is area engineer in charge at the dam. Lawrence Grotjan is chief of surveys and safety engineer.

Fig. 5. Spreading and sprinkling pervious material in Zone 3 of Santa Fe Dam. The material is placed in 12-in. layers.

Chicago Utility Organized for Air Raids

***Contents in Brief**—Commonwealth Edison Co. of Chicago has organized a plant protection and emergency service for safeguarding its property and personnel against sabotage and air raids. Key to the service is a fleet of patrol cars equipped with two-way F-M radio sets and manned by special police that are part of a large armed and uniformed force.*

SLEEK GREEN SEDANS marked "Emergency" and bearing the Edison Service emblem of Commonwealth Edison Co. are now a familiar sight on Chicago's streets and highways. Manned by armed, uniformed guards and equipped for two-way F-M radio communication, these cars are the patrols-on-wheels that tour the city twenty-four hours a day to help guard its vital electricity supply system from sabotage.

The radio patrols represent one of the more spectacular phases of a comprehensive and effective plant protection program the Chicago utility has developed to cope with wartime contingencies. This program had its inception more than a year ago and the men who worked it out have been governed not by what *might* happen, but what *could* happen, in an emergency.

The company's plant protection organization is divided into two distinct units. One is a large force of full-time uniformed special police engaged in patrol and watch service, the other a volunteer auxiliary defense corps formed by Commonwealth Edison Post of the American Legion. The latter will supplement the work of the police and fire departments, civilian defense authorities and the regular Edison protection and construction forces in case of air raids or other emergencies affecting the company's properties.

The radio patrol cars, which provide anti-sabotage protection to the entire Edison system, cover established beats, but their itineraries are frequently changed so that their appearance at a specific location at any given time cannot be anticipated. Carefully selected, well-trained guards in these mobile units are in constant short-wave contact with a centrally located control office. The cars are always so close to major electric production, transmission and distribution centers in the territories they patrol, that a flash from the central radio operator will bring them to any location on their beat within a very few minutes.

All members of the radio patrols are licensed radio operators. Their contacts with the central office are conducted almost entirely in verbal code on a frequency substantially above the top range of household receiving sets. The central operator knows at all times the squads' approximate location.

Of prime importance to the speed with which these cars can arrive at the scene of a suspected sabotage attempt is an ingenious alarm system that warns the central operator the instant any tampering occurs. He then broadcasts instructions to the squad nearest the location and the men immediately speed to the spot.

All Edison employees engaged in anti-sabotage work are deputized by the Chicago Police Department, which is in continuous cooperation with the operation of the company's plant protection system. A radio tie is maintained with the Chicago station of the Illinois State Police as well. The Federal Bureau of Investigation is also cooperating, as are other law-enforcing agencies.

The heavy wire fences surrounding the company's generating stations and the waterfronts near these plants are regularly patrolled by watchmen, day and night. Fences are bathed in a continuous curtain of light after nightfall and high-voltage switching structures and other major outdoor installations are also illuminated.

Special training

Employees at all the company's generating stations, substations, switching centers and other vital locations have received intensive training in what to do in case of an air raid. These plants are equipped with the necessary water pumps, hose and other devices needed to combat incendiary bombs, and definite procedures have been established so that everyone knows exactly what to do in an attack.

In an emergency the Commonwealth Edison Post Defense Corps would also be called into service. Formed several months ago as a voluntary organization at the suggestion of post members, this auxiliary arm of the company's protective system now numbers nearly 1,200 men. Organized along efficient, military lines, the Edison Post defense corps consists of four divisions, each

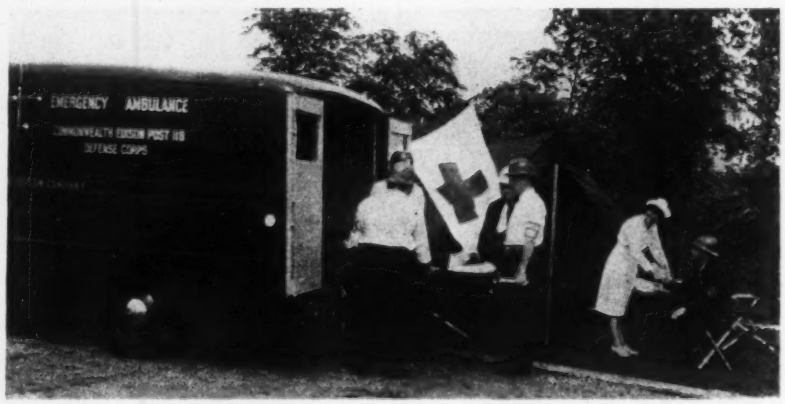


Fig. 1. Commonwealth Edison's emergency fleet includes eight ambulances, rebuilt from delivery trucks, and four field dressing stations. The first-aid squad is shown here going through a dress rehearsal.

assigned to a definite zone. Divisions are subdivided into two battalions, each comprising one platoon of auxiliary firemen, one of auxiliary police and one of first-aid men.

In equipping the corps, the company has taken into account every predictable need of a real wartime emergency. Eight Edison delivery trucks have been rebuilt to serve as ambulances, and four others have been converted to mobile field kitchens. Half of the ambulances contain two-way, short-wave radios. Six auxiliary fire pump trucks have also been assigned to the contingent.

All defense corps members complete a comprehensive training course, embodying both classroom work and practical application of what they have learned. The auxiliary firemen receive their preliminary instruction under the tutelage of company fire-fighting experts and actually "get the feel" of the job at Chicago fire department drill schools. Through lectures, motion pictures and textbooks, they study types of fires and fire extinguishers, common fire hazards, the use of gas masks, fire control and extinguishment, and the combating of incendiary bombs. At the drill school the men work with various types of hose and nozzle equipment, operate ladders, tie rope knots and fire line hitches, and learn numerous other phases of firefighting.

Auxiliary policemen are trained by supervisors of the company's full-time plant protection staff.

First-aid corps

First-aid members of the corps are trained in the standard and advanced American Red Cross courses and also receive instruction in the identification and treatment of war gas cases, rescue work and the use of first-aid equipment. Should a company plant be hard hit in an air raid, these men would immediately take over the task of extricating the injured and treating their wounds, thus releasing the operating and construction forces for the important work of restoring electric service.

Each first-aid man wears a specially designed belt containing necessary supplies. He has also a flashlight for use in blackout, a lipstick for marking patients' forehead with the symbol indicating the treatment given, and a pad and pencil for recording statements of the injured and keeping first-aid records.

Fig. 2. Field kitchens are ready to serve utility workers on emergency duty.

Portable field dressing stations are carried by four of the ambulances. These tents and their equipment would be set up near the scene of a bombing for the use of company doctors and nurses when no serviceable building in the neighborhood was available for the purpose.

To make certain that the varied activities of the defense corps will be coordinated properly in an actual enemy bombing attack, several dress rehearsals have already been held at company generating stations. Frequent practice sessions of smaller units of the corps are also conducted.

High-Intensity Rainfall at Larchmont

Arthur Richards
Engineer Executive, Larchmont, N. Y.

RAINFALL of unusual intensity occurred at Larchmont, N. Y., on the morning of July 27, 1942, the maximum intensity for the one-hour period being greater than any in Merriman's tables for the highest rainfall recorded in the United States. This is shown in the following tabulations:

Rate of Maximum Rainfall Intensity in Inches per Hour

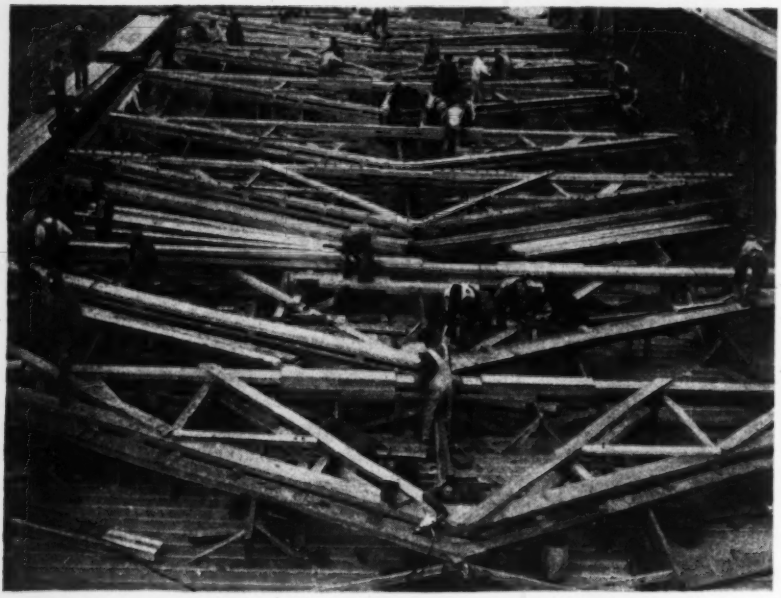
	5 min.	10 min.	60 min.
Larchmont, N. Y.	6.00	5.28	3.59
Bismark, N. D.	9.00	6.00	2.00
New York City	7.20	4.92	1.60
Galveston, Texas	6.48	5.58	2.55

The area of the storm was about 200 sq.mi., with the Larchmont watershed about the center of the most intense precipitation.

At the dam and reservoir of the Larchmont water supply system there is located an automatic recording rain gage, and an automatic level recorder which shows the elevation of the reservoir water in relation to the dam spillway level. Water was 0.58 ft. below the spillway at 4.30 a.m. when the storm began, rose to spillway level at 6.10 a.m., and reached its crest of 1.256 ft. at 11.20 a.m., or six hours and fifty minutes after rain began to fall. The watershed area of 2.74 sq.mi. is about 4.15 miles long and 0.66 mile wide. During the two-hour period of heavy rainfall about 268,400,000 gal. of water fell on the watershed. The runoff up to the time water reached the spillway crest was only 9.13 percent, this relatively small amount being due in part to the dry condition of the ground, the dense vegetation in the drainage area, the slight slope of the stream, and the relative length of the watershed to its width.

During several other storms of the past five years when the rainfall was less intense and of much longer duration, spillway crests of 1.50 ft. were reached with a discharge of about 124,000 gal. per min. against 95,000 in this instance.

The storm caused considerable damage in Larchmont and neighboring communities as none of the storm drainage systems or streams could carry the heavy flow. Streets flooded over the curbs with the result water entered the basements of thousands of homes and buildings within the storm area, causing considerable damage to contents, oil burners and other equipment.



Fast Truss Fabrication

Contents in Brief—*Mass production methods were developed for fabricating 1,050 timber trusses, mostly 50-ft. spans, at one ordnance plant, where an average of 28 trusses requiring 1,500 ft. b.m. lumber each were turned out per eight-hour shift. Production on fabricated wood columns was more than double the truss rates.*

SHORTAGE OF STEEL is reviving the old art of building with wood, but there is nothing old about the methods that contractors are using in timber construction on the big war plants today. As an example, the usual procedure of site prefabrication on a mass-production basis was brought to high efficiency on a large Midwestern ordnance plant recently, where 1,036 timber trusses of 50-ft. span, several of 40-ft. span, and twice as many timber columns were pushed through a single shop.

Trusses were turned out at an average rate of 28 per eight-hour day on eight jigs and columns were built at double that rate. The carpenter shop also took in stride the fabrication of wall and roof sections for 20,000 lin. ft. of covered ramps that connect the various manufacturing buildings. Then, too, just as a side-

Fig. 1. Prefabricating trusses and columns. Top—Timber, ordered to length, rolls into the saw shop on diagonal conveyors, at right, and after being trimmed and chamfered, rolls out to fabricating platform in the foreground. Note both columns and trusses. Center—Laid out on jigs the pieces were bored, routed and bolted. Bottom—When completed the trusses were removed from the platform by a crane and stacked ready for hauling to the field.

line, the shop turned out 65 sentry boxes. An article describing the structures and facilities at this ordnance plant, as well as the general construction operations, was published in *ENR* Aug. 27, 1942, p. 49.

Truss design details

The 50-ft. trusses are a six-panel modified Pratt type, with the diagonals nearest the end extending down the columns as knee braces. There is also a vertical ¾-in. longitudinal rod at the center. Top chords are two 4x10's, bottom chords two 4x8's. Web members are single and double 3x6, 3x8 and 3x10-in. timbers. Purlins, 2x12 in., are set on top of the trusses in the field, held by triangular knee blocks nailed on top of the top chords. The diagonal truss members framing into the columns are also erected in the field.

Columns for the 50-ft. spans are made up of six 2x8-in. timbers spiked together; five timbers are used for the 40-ft. trusses. At the top, side plates are bolted on for the truss connections, and angle seats are bolted to the bottom. Wall and roof sections of the ramps are simple 2x4-in. frames covered with 1-in. sheeting. Walls were built up in 10-ft. lengths, roofs in 16-ft.

Fabrication methods

The carpenter shop was unusually simple for the amount of work turned out. Dimension lumber, ordered to design lengths, was stored in the open near one end of the shop from where portable roller conveyors carried it as required to a saw line inside. Here three saws did what little trimming and cutting was required, mainly chamfering the ends of chord members. An auxiliary line, equipped with only one saw, handled the miscellaneous work.

After passing through the saw line the timber pieces rolled out of the shop on a conveyor to an outdoor platform assembly bay. Here were eight jigs, merely stationary frames upon which the trusses were fabricated in horizontal position.

The trusses were first laid out complete, that is, every member was placed in its right position, and toe-nailed temporarily. Then the bolt holes ($\frac{13}{16}$ in. for ¾-in. bolts) were bored, after which the assembly was dismantled for routing of split-ring grooves. These grooves, 4 in. in diameter, were routed ½ in. deep. Next the trusses were re-assembled with the split rings and shear plates in place, and then the members were bolted up. All boring, routing and bolt tightening was with electric tools.

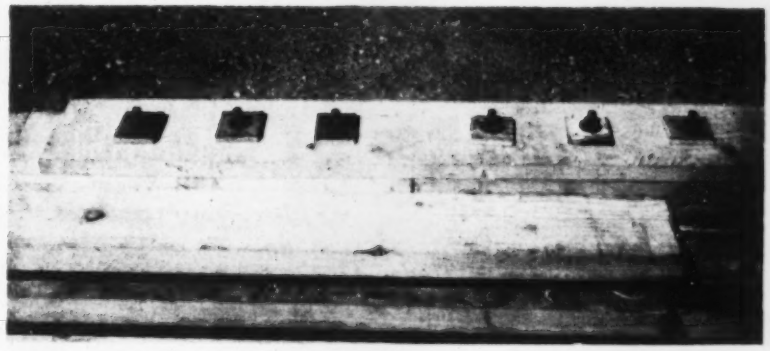


Fig. 2. Substitution of plywood for steel washers effected on important metal savings. By tacking the 4-in. plywood squares with edges parallel to the truss members a neat appearance was obtained.

One crew for each operation

Because of differences in time and number of men required for the three main operations—layout, drilling and assembly—each operation was done with a separate crew that moved from jig to jig. There were from three to six carpenters and two laborers working on each jig.

Each 50-ft. truss required 1,500 ft.b.m. lumber, and was assembled with ninety ¾-in. bolts and one hundred seventy-two 4-in. split rings. Some 500 separate drilling and routing operations were involved for each truss. Fabrication of 28 trusses per day involved drilling 12,000 ft. of $\frac{13}{16}$-in. holes and 450 ft. of 4-in. kerfs ½ in. deep for the rings.

In fabricating the last 200 trusses the contractor substituted plywood washers for cut steel washers, which were being used in great quantity because of the variations in thickness of the timber. The washers were cut from $\frac{3}{16}$-in. scrap form panels into 4-in. squares and bored in the shop. The wood washers were placed on the threaded end of the bolt under a single cut washer. Experience showed that single plywood washers were of sufficient thickness to compensate for all variations of lumber thickness. At first the wood washers were placed in any position, but it was found that the appearance was greatly improved by tacking them in position square with the outside truss members. The contractor estimates 180,000 cut washers were saved by use of the plywood washers in the 200 trusses fabricated.

Columns were made up inside the carpenter shop by separate crews. Fabrication of ramp wall and roof sections and the sentry boxes was outside the carpenter shop, just off the truss platform. All prefabricated units were loaded onto special trailers by a crane for transportation to location.

Fig. 3. The columns, 2x8-in. timbers spiked together, were made up in the carpenter shop at the rate of 56 per 8-hr. shift.

High-Speed Water Softening Process Makes Its Municipal Debut

Alex Van Praag, Jr.
Warren and Van Praag, Inc.
Consulting Engineers, Decatur, Ill.

***Contents in Brief**—New to the municipal water softening field is the "Spiractor" process installed at Teutopolis, Ill. Here lime treatment is accomplished with a 5-10 minute detention period by means of catalytic precipitations. Not only does the process give fast action, with resulting economies in size of plant, but the end product is a granular substance quite unlike the sludge normally produced by lime treatment.*

A NEW TYPE of cold lime process water softening plant has been installed at Teutopolis, Ill., which is of particular interest because:

It produces an easily handled, granular by-product instead of the usual wet, pasty, difficult-to-handle sludge.

Its reaction tank is only about one-thirtieth the size of the old-fashioned type or one-eighth the size of the newer sludge blanket type of reaction tanks.

The reaction tank and filters operate under full city pressure.

It is the first municipal water softening plant of its kind to be installed in the United States.

The raw water supply for Teutopolis, drawn from a deep well, is clear but deposits iron on standing in contact with the air. Its hardness runs quite constant at about 270 ppm. The following analysis represents a typical sample:

Total hardness as $CaCO_3$	271 ppm.
Calcium hardness as $CaCO_3$	165 ppm.
Magnesium hardness as $CaCO_3$	106 ppm.
Methyl orange alkalinity as $CaCO_3$	382 ppm.
Phenolphthalein alkalinity as $CaCO_3$	0 ppm.
Free carbon dioxide as CO_2	21 ppm.
Iron as Fe	0.5 ppm.

Either the zeolite or the cold lime process could be used with this water and each presented certain advantages. Bids were obtained, therefore, on both types of equipment and, after weighing the relative installation costs, operating costs, composition of effluents, etc., it was decided to accept The Permutit Co. bid for installation of a "Spiractor" type of cold lime process water softening plant.

The Spiractor is the invention of Dr. E. T. Zentner of Czechoslovakia. It has been in use for about five years in Europe where a number of plants, including some very large ones, have been installed. It is also used in England but is relatively new here and the Teutopolis plant is the first municipal installation in this country.

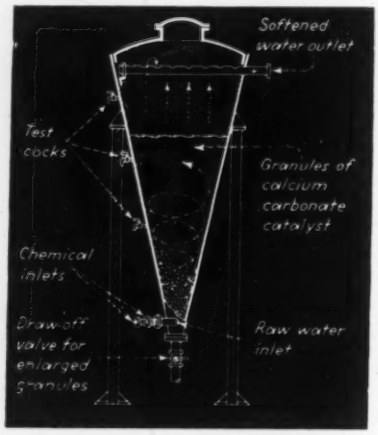


Fig. 1. Water enters at the bottom of the tank, circulates upward through a bed of granular catalyst, and emerges as a softened effluent. (Below) Catalyst granule showing layers of deposited precipitate.

Outstanding features of the Spiractor are its small size—since it provides only a five to ten-minute detention period of the water to be softened—and its production of a granular by-product instead of the usual voluminous, wet and pasty lime sludge. This granular material drains so quickly that, in less than 24 hours, its moisture content is reduced to less than 5 percent and it can be handled like slightly damp sand. The process involves the principle of catalytic precipitation, the granules serving as a nuclei around which the precipitated compounds of calcium and magnesium build up.

Treatment requirements

Due to the iron content of the raw water at Teutopolis, it was decided to precede the lime treatment with aeration, which would oxidize the soluble ferrous bicarbonate to insoluble ferric hydroxide and would also reduce the content of free carbon dioxide. The treatment, therefore, consists of aeration, softening and filtration. In addition, chlorination is practiced by feeding hypochlorite with the lime suspension.

A view of the treatment plant, which measures 27.5 x 32.8 ft., showing the aerator and aerated water storage tank to the right, is given in Fig. 2. The well, with the raw water pump, is housed in the room at the left rear of the building; in the right rear portion is the chemical storage room. A room, extending across the entire front, houses the service pump, chemical feeds, filters and Spiractor; the top of the latter extends up into the cupola at the left. Filters are located alongside the left wall, and the laboratory is in the front right corner.

In Fig. 3 is shown the lower portion of the conical-shaped Spiractor tank (at the right) adjacent to the

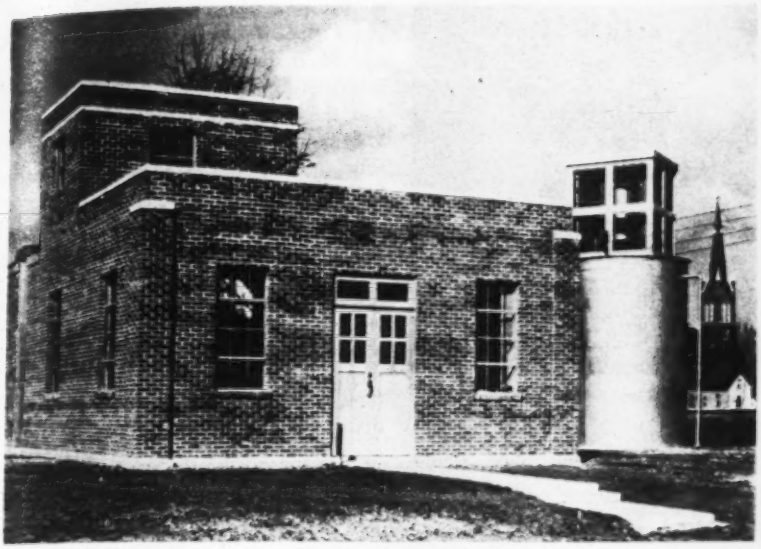


Fig. 2. Municipal water treatment plant at Teutopolis, Ill., in which is incorporated the Spiractor softening process.

coagulant tank. The two sand filters and the master meter are shown in the left foreground.

Flow of water through the plant (Fig. 4) is as follows: A turbine-type well pump lifts the water to the top of the aerator. Here it drops, by gravity, over several coke trays into the aerated water storage tank. The well pump is automatically operated by float switches in this storage tank to maintain the height of water between predetermined levels. From the aerated water storage tank the service pump sends the water through the Spiractor, filters and master meter to the mains and a 60,000-gal. elevated storage tank floating on the line. The level of water in the elevated tank controls the starting and stopping of the service pump and chemical feeds, thus permitting automatic operation of the plant.

How water is softened

The Spiractor is a conical-shaped tank, the top diameter of which is 4.5 ft., the conical sides are 11 ft. high (Fig. 1). The top consists of a rounded or "bumped" head fitted with a manhole and also a charging hole for catalyst.

This conical tank is slightly more than half filled with fine granules of calcium carbonate catalyst (about 0.1 to 0.2 mm. in size). Raw water enters the bottom through a special fitting containing a tangentially disposed nozzle. Through another opening in this fitting, the proportioned dosage of lime suspension is pumped. This mixes with the upward swirling water, the flow rate of which is high enough to maintain the granular bed in a suspended condition and low enough to avoid carrying any of the granules over the top of the tank.

The immediate contact of the chemically treated water and the suspended catalyst granules greatly accelerates the softening reactions between the added lime and the hardness content of the water. The resultant, relatively insoluble, reaction products are thus formed while the water is still in contact with the granules and consequently deposit on the surface of the granules in the form of successive, firmly adherent layers, i.e. accretions. In fact, a cross-section of one of these granules, after it has grown, has the same sort of ring-like structure that one sees in the cross-section of a tree.

Agglomeration of the granules into compact masses such as occurs in downflow filters receiving un-neutralized lime-soda treated water does not occur in the process because the catalyst bed is maintained in a suspended condition. Thus the granules always are in motion and cannot be cemented to each other by the newly formed reaction products.

As the water continues to pass through the Spiractor, the accretions on these granules cause them to grow in size, and this in turn results in a proportionate increase in the total catalyst bed volume. In normal operation, the Spiractor unit is filled with sufficient catalyst so that, when the plant is operating, the expanded catalyst bed will be just above the level of the second test cock (Fig. 1). As the bed volume increases and reaches the top test cock, a portion of the coarsest of the enlarged granules is removed through the drawoff valve at the bottom of the unit. The volume removed is sufficient to lower the level of the catalyst bed to a point below the second test cock. Fresh catalyst

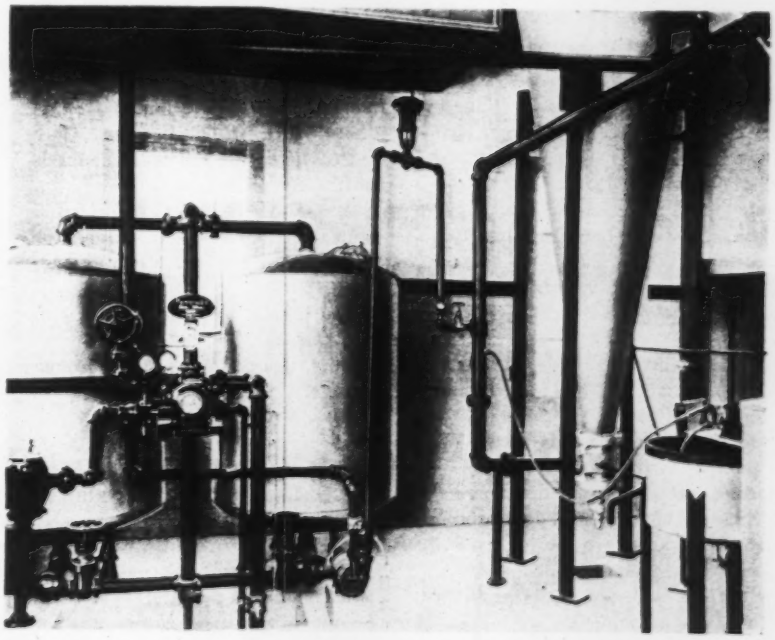


Fig. 3. Interior of the plant, showing the two filters and the softening unit.

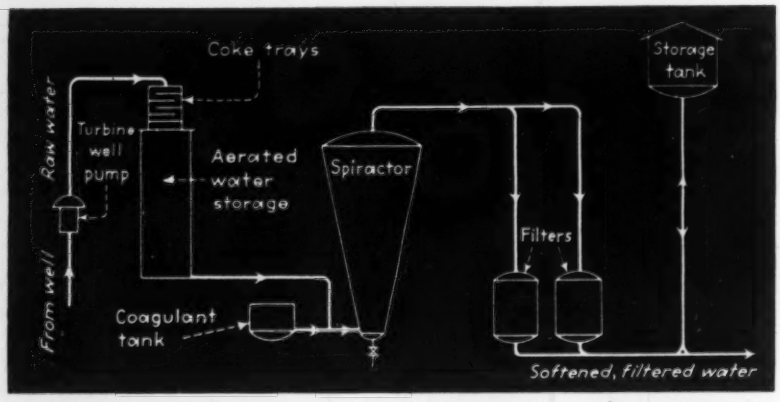


Fig. 4. Flow diagram, showing the sequence of processing in the production of softened, filtered water.

is then discharged into the top of the unit in such quantity that when the bed is again expanded, the catalyst level is at about the second test cock.

As the Teutopolis plant is not very large, the withdrawal of the enlarged catalyst is accomplished by discharging it into buckets. In larger plants, the catalyst may be discharged into drain carts or into a heap for draining. Also, in larger plants, the catalyst may be crushed and screened for re-use or, in very large plants, operating for removal of calcium hardness alone, the surplus of enlarged catalyst may be re-burned to lime and thus recovered.

Operating experiences

With the Teutopolis plant, removal of some of the magnesium is required and, in such cases, the addition of a small amount of an aluminum or iron coagulant is advisable. The dosage of coagulant, in this case, is the same as that used with other types of cold lime-soda water softening equipment. Likewise, the dosages of lime employed are the same as those used with the sludge blanket type of equipment.

The effluent produced at Teutopolis is in stable chemical balance and the accompanying analyses of the aerated water and the softened, filtered water show typical results.

A large number of stability tests have been made on the final treated water by allowing it to stand in closed bottles for periods of 24 and 48 hours. Analyses subsequent to standing have indicated that there is practically no further decrease in hardness or alkalinity or increase of turbidity on such extended standing which gives evidence of the high stability of the effluent.

The Teutopolis plant is designed to handle a flow rate of 70 gpm., which is sufficient to take care of estimated future demands for a number of years. The size of the Spiractor to handle this flow rate is, as previously stated, 4.5 ft. in dia. and 11 ft. high. The steel coke tray aerator is 36 in. in dia. and 6 ft. high. The aerated water storage tanks is 11 ft. in dia. and 15 ft. high. The lime feed tank is 48 in. in dia. and 3.17 ft. high and the coagulant tank is 30 in. in dia. by 16 in. high. Each of the two sand filters are 54 in. in dia. by 5 ft. high.

Construction of the water softening plant at Teutopolis was a part of a complete new supply and distribution system improvement. This included development of wells, and construction of a pump station, treatment plant, and elevated steel storage tank, as well as the installation of a distribution system of cast-iron mains with customary auxiliary items including customers' services and meters. The system in its entirety was constructed by the Work Projects Administration with the exception of the water softening plant, which was constructed by The Permutit Co., and the elevated water storage tank, which was installed by The Chicago Bridge and Iron Co.

Costing $75,000, the project was financed by an issue of general obligation bonds and a supplemental issue of water revenue bonds that will be retired from the earnings of the water system. The village president is Eugene Brumleve.

The consulting engineers who designed the system were Warren & Van Praag, Inc., Decatur, Ill.

COMPARATIVE ANALYSES OF AERATED WATER AND THE SOFTENED, FILTERED EFFLUENT

Constituent	Aerated Water	Softened and Filtered Effluent
Total hardness as $CaCO_3$	271 ppm.	76 ppm
Calcium " " "	165	12
Magnesium " " "	106	64
Methyl orange alkalinity as $CaCO_3$	382	184
Phenolphthalein " " "	0	92
Free carbon dioxide as CO_2	10	0
Iron as Fe	0.3	0.1
Turbidity	5	0

Six Ways to Soften Water

IN A REVIEW of developments in water softening presented to the American Chemical Society meeting in Buffalo on Sept. 8, H. M. Olson of The Ohio Salt Co., listed the following methods of soft water processing:

Softening by chemicals from batch system (one tank) to continuous flow sludge blanket precipitators and catalytic precipitators (Spiractor).

Conditioning by evaporation with pretreatment.

Zeolite, base exchangers, hydrogen exchangers, anionic and cationic exchangers, with and without pretreatments, starting with fused synthetic zeolite regenerated with salt to remove hardness to modern demineralizing, carbonaceous and resinous zeolite minerals using salt, acid and alkalies as regenerants.

Hot chemical precipitation systems for removal of silica, gases, etc., for boiler feed at normal and high-pressure operations, using mechanical stirring, filtered water backwash, two-stage softening, application of various types of chemicals, removal of silica, treatment of high alkalinities and recirculation of boiler water.

Development of floc formers.

Development of various forms of corrosion inhibitors, carbons for odor and taste removal, fluorides, etc.

Mr. Olson cited the possibilities of split treatment using a catalytic precipitator (Spiractor) for calcium deposition and a sludge blanket precipitator for magnesium deposition without the use of filters in municipal water treatment. He also stressed the possibilities of pretreatment, chemical precipitation, zeolite exchange, recarbonation, etc., for city and industrial water supplies with a multiplicity of combinations for processing boiler feed, textile, etc., to suit conditions.

From Field and Office

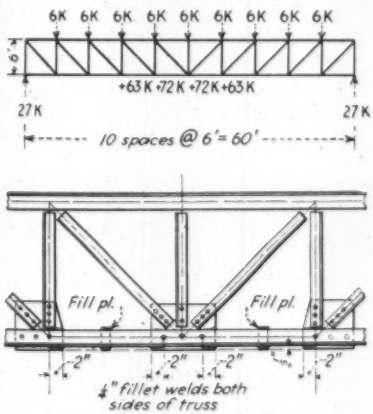
WORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTORS

Maintaining Full Section Of Truss Chord Angles

Because structural steel is becoming scarcer, even for the most vital defense plants, more economical designs are becoming increasingly important. The welding of bottom chords of trusses, as illustrated in the accompanying sketch, will not add appreciably to the cost of fabrication, since many structural fabricating plants are using welding to a greater extent and are incorporating welding into the fabrication process by tack welding members before riveting. At the same time the method saves steel.

The sketch shows a 60-ft. truss with a typical design loading or a load of 6 kips per panel. This loading makes the maximum stress in the bottom chord 72 kips and 63 kips in the adjoining panels. Using a design stress of 18,000 psi. and deducting one rivet hole from each angle for the net area, the loading requires the use of two 4x3x$\frac{3}{8}$-in. angles for the bottom chord.

The angles, which in full section together are capable of carrying 75 kips, with the rivet hole deducted will have a total capacity of 66 kips. However, by incorporating welding at the two center panels, as shown in the sketch, it is possible to maintain full area of the bottom chord angles. The weld at the ends of the plates transmits stress through the plate, around the rivet holes and back into the angles. Since the stress in the fourth panel of the truss is 63 kips, welds need only be placed on the three middle gusset plates to permit use of the smaller angles.



By means of a small plate welded in place, full section was maintained at midpoint of bottom chord of truss.

This design results in a saving of 155 lb. of steel per truss. Similar savings may be effected if a design stress of 20,000 psi. is used.—CLAUDE S. WILSON, *Structural Engineer, John F. Beasley Const. Co., Muskogee, Okla.*

Electro-Magnetic Nail Pickup

Industrial plants that have large paved areas traversed continually by pneumatic-tired equipment are making important reductions in the risk of punctures by use of electro-magnets. The magnets, essentially energized coils of wire, are moved about the paved area while raised 2 to 4 in. above the surface.

An outfit to do this work can frequently be assembled on the job in the electrical department. A typical example of equipment that would do is a 2-hp., gasoline-engine-driven generator (a d.c.-generator capable of delivering about 60 amp. such as is used on many welding sets) mounted on a truck from whose rear end is suspended a 4-ft. length of 8 or 12-in. channel iron. In the channel is mounted a coil that may be 300 turns of No. 14 copper wire or something on that order.

The electro-magnet is particularly useful in plants where there is a considerable amount of black-top paving. On warm days bent nails become partly embedded in the bituminous surface and hence mechanical sweepers do not pick them up. A good electro-magnet, however, will pull such pails out of the oiled surface and will also gather up a surprising collection of metal fragments that are a constant menace to tires.

Because of the weight of a 4-ft. channel and coil, making it difficult for a one-man crew to handle it, some plants use two coils, each mounted on a half-length piece of channel iron. This brings the unit weight down to an amount that one man can handle readily. The full-length channel with single coil is considered better.

Swinging Leads Changed to Fixed Members at Little Cost

To change the swinging leads on a piledriver to fixed leads C. B. Taylor, superintendent for Melberg & Taylor, contractors for the Iowa approach for the highway bridge under construction across the Mississippi River at Dubuque, placed a 5-in. dia. steel pipe inside each of the box leads and for the braces between the bottom of the leads and the crane used 3-in. pipes telescoping inside 4-in. pipes. The 5-in. pipes were

Cost of the change-over from swinging to fixed leads on this piledriver was recovered in two days, since three or four fewer workmen were needed for driving piles.

supported by a 2½-in. dia. pin at the tip of the boom and the leads were raised or lowered on the pipe by a block and fall hung on the boom. This arrangement left the two hoist drums of the crane free for operating the pile hammer and handling the piles.

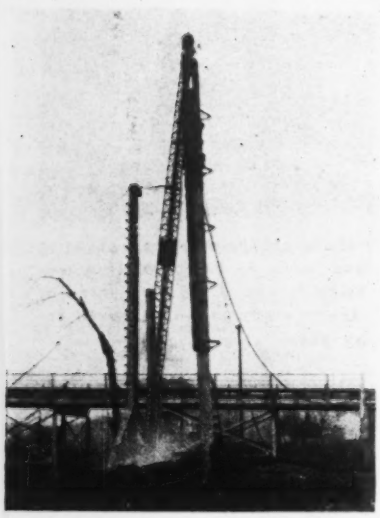
To set the leads for driving on a batter, holes at 6-in. c.c. were drilled through the 3 and 4-in. pipes and a ⅞-in. dia. steel pin dropped through the holes in both pipes at the position giving the required batter.

Estimated cost of the change in the leads was $40 to $50. Since three or four workmen were released for other work by the improvement, the saving in wages paid for the new equipment in two days. The fixed lead arrangement requires only two men, in addition to the crane operator and foreman, and has proven much faster. The driver was also safer to use, since, if the ropes supporting the driver broke, the leads only slid down the 5-in. pipes.

GIN POLE USED TO DRIVE PILES

In driving eight 50-ft. long, precast test piles for a new highway bridge at Carrolton, Ky., Harry Wyse, Lexington, Ky., employed a gin pole as shown below. The timber mast was used to erect the gin pole, which is 60 ft. long. The piles were driven with a 10,000-lb. hammer to determine the length of the penetration necessary for each pile to support 50 tons.

The bridge is being built by the Kentucky State Highway Department with James O. Cornell, engineer in charge, and the Missouri Valley Bridge and Iron Co., Leavenworth, Kan., is the general contractor.



Notes From War Jobs

METHODS USED TO SPEED CONSTRUCTION AND WIN THE WAR

Competition Speeds Building

Thermometer-type charts on a building silhouette stimulate and speed construction at a U. S. Army air depot by comparing the work accomplished with that at two similar bases at widely separated points. As illustrated by an accompanying photograph, the charts record progress on one type of building or for some definite part of the work, and they are posted conspicuously in the particular area to which they refer. They are brought up to date semi-monthly by an exchange of information between the Corps of Engineer forces, who are in charge of construction at the three depots. Following the idea of hoisting the flag when a skyscraper is topped out, the 4-ft. high charts are made to represent a tall building, with a flag on the mast to be painted in when the building is completed.

Limiting the charts, and the competition, to a single building brings home to each man the fact that he alone can help speed the work. When the men become interested in completing a job ahead of someone else they themselves are anxious to speed up laggards; and they put pressure on the foreman, the superintendent and the materials men to see that everything is ready for their use.

Only one figure is posted on the charts, the percent of completion of the structure, taken from the official reports. No quarter is asked or given for delays, red tape, priorities or the other ills construction is heir to; either the work is done or it isn't, and the record is kept on that basis. It is recognized that one of the other depots in the comparison had much more severe weather during the winter months but this did not show on the chart and served only to make those in the more favored location feel they should be farther ahead.

Two of the depots were started two weeks earlier than the third. After four months the third job was behind the other two on every individual building and the chart system was suggested by the field forces as a means of expediting that work. At present the work on the formerly lagging third job is well in advance of the other two on almost every part of the work.

Charts showing rate of advancement on separated projects speed up construction.

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Yes, RITECURE has a long record . . . a record of helping contractors to produce better concrete structures economically. It is the ideal curing material for airport construction where speed is essential. It reacts with the calcium radical in the concrete, not only to form the impervious, semi-elastic, moisture-sealing membrane but to hard-surface the concrete. RITECURE increases the abrasion resistance and durability of concrete surfaces.

RITECURE is economical to use and easy to apply. One gallon will cover from 30 to 40 square yards with tough, lasting, impervious membrane which effectively seals in the moisture during the entire critical curing period. By test, it shows 97.4% water retention for 24 hours, 96.2% for 72 hours, and 92.4% for 168 hours. It's the 60% solids that count.

•*RITECURE is furnished with a temporary color indicator to aid application and inspection.*

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CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

HIGHWAYS AND BRIDGES
OKLAHOMA

OWNER: Oklahoma State Highway Comm., Oklahoma City. PROJECT: Grading, drainage, concrete paving, and construction of five reinforced concrete bridges in Oklahoma County, Okla. Pavement is of four-lane width, each lane 22-ft. Total length of project including approaches is 6.121 miles. CONDITIONS: Contractor to furnish all materials and complete work in 200 working days. Rail and highway transportation facilities available to site of work. Material and labor shortages are expected to appear before completion of project, as it is difficult to obtain low preference rating for this type of construction. Wage rates are: skilled labor, $1.00 per hr.; semi-skilled, 60c.; common, 40c.

LIST OF BIDDERS: (Awarded June 2, 1942)

1. Moran & Buckner, Muskogee, Okla. (contract) $582,567
2. Ryan-Beekman, Oklahoma City, Okla 592,345
3. J. Bris-coe, Stillwater, Okla 594,881

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Class D excavation, unclassified	133,617 c. y.	$0.27	$0.30	$0.28
2. Rolling	1,745 hr.	1.65	1.50	1.65
3. Sprinkling	3,273 M gal.	.80	1.00	1.00
4. Overhaul	76,480 sec. y.	.033	.04	.04
5. Shoulders	6.209 mi.	325.00	300.00	300.00
6. 4-in. gravel base course	2,273 s. y.	.50	.40	.60
7. Rolling base course	16 hr.	1.50	1.50	1.65
8. Sprinkling base course	45.5 M gal.	1.00	1.00	1.00
9. Prime material	796 gal.	.12	.10	.11
10. Plain cement conc. pavmt. (9-6-9-in.)	135,292.8 s. y.	2.02	2.03	2.10
11. Approach slab	228.05 s. y.	4.50	4.50	4.50
12. Struct. excav., unclassified	2,750 c. y.	1.00	.90	1.10
13. Creosoted common struct. timber	34.12 Mbm.	180.00	200.00	200.00
14. Class A concrete	885.48 c. y.	20.00	18.00	18.00
15. Class AA concrete	6 c. y.	20.00	20.00	18.00
16. Reinforcing steel	77,215 lb.	.05	.05	.05
17. 18-in. rein. conc. pipe	168 l. f.	3.00	3.50	3.00
18. 24-in. rein. conc. pipe	616 l. f.	3.60	4.00	3.50
19. 30-in. rein. conc. pipe	96 l. f.	5.00	5.00	4.00
20. 6-in. integral curb	530.92 l f.	.37	.40	.40
21. Concrete curb (6x12-in.)	51,453.6 l. f.	.40	.40	.38
22. Concrete curb (6x13-in.)	53.6 l. f.	.45	.40	.45
23. 1½-ft. comb. curb and gutter	2,397.2 l. f.	1.20	1.20	1.20
24. Remove concrete pavement	21,074.6 s. y.	.27	.25	.25
25. Asph. surf. and gravel removed	44,423 s. y.	.22	.20	.20
26. Monument	1 ea.	10.00	15.00	10.00
27. Right-of-way markers	178 ea.	2.20	3.00	2.00
28. Bermuda tuft sodding	228,666 s. y.	.025	.03	.03
29. Water for sodding	2,286.66 M gal.	1.00	1.00	1.00
30. 12-in. rein. concrete pipe	120 l. f.	2.00	2.00	2.00
31. 15-in. rein. concrete pipe	128 l. f.	2.50	2.00	2.50
32. 18-in. bit. coated corr. met. pipe	80 l. f.	3.30	3.00	3.50
33. 24-in. bit. coated corr. met. pipe	120 l. f.	4.40	4.00	4.50
34. 30-in. bit. coated corr. met. pipe	70 l. f.	6.60	5.50	6.00
35. 36-in. bit. coated corr. met. pipe	20 l. f.	7.70	8.00	8.00
36. 18-in. rein. concrete pipie	774 l. f.	.90	1.00	1.00
37. Relay 15-in. concrete pipe (rein.)	33 l. f.	.90	1.00	1.00
38. Relay 12-in. steel pipe	40 l. f.	.70	1.00	1.00
39. Relay 15-in. steel pipe	18 l. f.	.70	1.00	1.00
40. Relay 30-in. corr. metal pipe	32 l. f.	1.00	2.00	1.00
41. 6-in. concrete dividing strip	9,482.8 s. y.	2.20	2.25	2.24
42. Guide posts	136 ea.	2.10	2.00	2.00
43. Reflect. curb markers (crystal)	2,372 ea.	1.50	2.00	1.50
44. 6-in. black traffic stripe	146,779 l. f.	.025	.03	.025
45. 6-in. black traffic arrow	496 l. f.	.12	.20	.10
46. 2-in. electrical conduit	1,280 l. f.	1.65	2.00	1.50
47. Sand for blotting armor coat	4.5 c. y.	3.50	2.00	3.00
48. Asph. for armor coat seal	1,136 gal.	.12	.10	.11
49. Aggregate for armor coat seal	25 c. y.	4.50	2.00	3.00
50. Plain riprap	3.92 c. y.	4.00	2.00	2.00
51. 6-in. water treated subgrade	193,320 s. y.	.04	.04	.04
52. HES portland cem. conc. pavement	30,119.9 s. y.	2.22	2.23	2.24
53. Shoulders	0.007 mi.	325.00	300.00	300.00
54. Portland cem. conc. pavmt. (9-6-9-in.)	205.33 s. y.	2.02	2.03	2.10
55. Struct. excavation, unclassified	3,000 c. y.	1.00	.80	1.00
56. Remove existing structures	1 ea.	200.00	200.00	150.00
57. Class A concrete	604.9 c. y.	20.00	21.00	20.00
58. Reinforcing steel	69,560 lb.	.05	.05	.05
59. Concrete curb (6x12-in.)	84 l. f.	.40	.40	.38
60. Conc. pavement removed	135 s. y.	.27	.25	.25
61. Guide posts	6 ea.	2.10	2.00	2.00
62. Bermuda tuft sodding	260 s. y.	.025	.03	.03
63. Water for sodding	2.6 M gal.	1.00	1.00	1.00
64. 6-in. conc. dividing strip	14 s. y.	2.20	2.25	2.24
65. Reflector curb marker (crystal)	4 ea.	1.50	2.00	1.50
66. 6-in. black traffic stripe	210 l. f.	.025	.03	.025
67. 6-in. water treated subgrade	233.3 s. y.	.04	.04	.04
68. Shoulders	0.007 mi.	325.00	300.00	300.00
69. Portland cem. conc. pavm. (9-6-9-in.)	200.44 s. y.	2.02	2.03	2.10
70. Structural excav., unclassified	470 c. y.	1.00	.80	1.00
71. Remove existing structures	1 ea.	150.00	200.00	150.00
72. Rein. conc. hand rail	83.1 l. f.	2.10	2.00	2.00
88. Class A concrete	186.4 c. y.	20.00	21.00	20.00
89. Reinforcing steel	17,980 lb.	.05	.05	.05
90. 6x12-in. concrete curb	45 l. f.	40	[illegible]	38
91. Asph. surf. and gravel base removed	45 s. y.	.22	[illegible]	20
92. Bermuda tuft sodding	40 s. y.	.025	[illegible]	03
93. Water for sodding	0.4 M gal.	1.00	1.00	1.00
94. 6-in. conc. dividing strip	7.5 s. y.	2.20	2.25	2.24
95. Reflect. curb marker (crystal)	2 ea.	1.50	2.00	1.50
96. 6-in. black traffic stripe	112.5 l. f.	.025	.03	.025
97. 6-in. water treated subgrade	125 s.y.	.04	.04	04
98. Class D excavation, unclassified	1,400 c. y	.27	.30	28
99. Substructure excav., common	580 c. y.	1.65	1.50	1.00
100. Substructure excav., rock	25.4 c. y.	10.00	10.00	10.00
101. Remove existing structure	1 ea.	400.00	500.00	500.00
102. Rein. concrete handrail	224.5 l. f.	2.10	2.00	2.00
103. Structural steel	140,000 lb.	.07	.065	07
104. Class A concrete	253 c. y.	20.00	21.00	22.25
105. Class A conc. (P. & B. base)	95.2 c. y.	25.00	25.00	22.25
106. Class AA concrete	160.3 c. y.	20.00	20.00	22.25
107. Reinforcing steel	66,370 lb.	.05	.05	.05
108. Rein. conc. test pile	2 ea.	200.00	200.00	200.00
109. Untreated timber pile	540 l. f.	1.25	1.50	1.25
110. Rein. concrete piling	945 l. f.	4.00	5.00	4.00
111. Asph. surf. and gravel base removed	28 s. y.	.22	.20	20
112. Reflect. surb. markers (crystal)	24 ea.	1.50	2.00	1.50
113. 6-in. black traffic stripe	556.7 l. f.	.025	.03	.025
114. Shoulders	.005 mi.	325.00	300.00	300.00
115. Port. cem. conc. pavmt. (9-6-9-in.)	132.78 s. y.	2.02	2.03	2.10
116. Struct. excavation, unclassified	175 c. y.	1.00	.80	1.00
117. Rein. concrete handrail	54.5 l. f.	2.10	2.00	2.00
118. Class A concrete	209.1 c. y.	20.00	21.00	20.00
119. Reinforcing steel	18,360 lb.	.05	.05	05
120. 6x12-in. conc. curb	54.32 l. f.	.40	.40	38
121. Asph. surf. and gravel base removed	54.3 s. y.	.22	.20	20
122. Bermuda tuft sodding	48 s. y.	.025	.03	03
123. Water for sodding	0.48 M gal.	1.00	1.00	1.00
124. 6-in. concrete dividing strip	9.05 s. y.	2.20	2.25	2.24
125. Reflect. curb marker (crystal)	4 ea.	1.50	2.00	1.50
126. 6-in. black traffic stripe	135.8 l. f.	.025	.03	025
127. 6-in. water treated subgrade	150.9 s. y.	.04	.04	04

HIGHWAY, CALIFORNIA

OWNER: California State Highway Dept., Sacramento.

PROJECT: Grading, crushed gravel base and plant-mixed surfacing 7.9 miles of highway near Linda Corners in Yuba County, Calif. Work includes clearing and grubbing; roadway, structural, ditch and channel excavation, and appurtenant work.

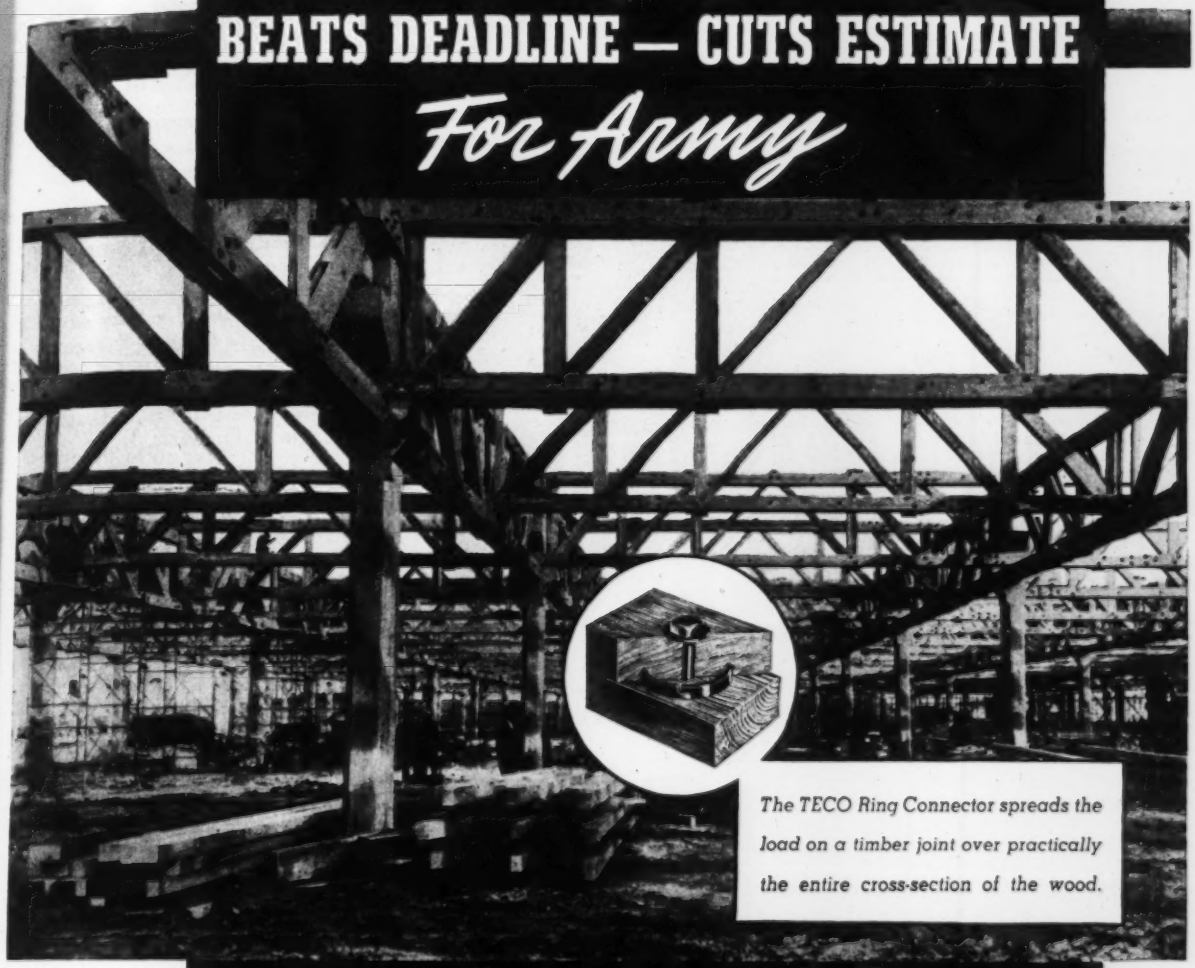
CONDITIONS: Contractor to furnish all materials. Highway and rail transportation facilities available. Wage rates specified are: skilled labor, $1.06¼ to $1.75 per hour; semi-skilled, 90c. to $1.20; and common, 87½c. Project has A-1-j priority.

LIST OF BIDDERS: (Awarded July 2, 1942)

1. Hemstreet & Bell, Marysville, Calif. (contract) $476,225
2. A. Teichert & Son, Inc., Sacramento, Calif 519,508
3. Fredericksen & Westbrook, Sacramento, Calif 615,454

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Remove concrete	15 c.y.	$10.00	$5.00	$12.50
2. Clear and grub	L.S.	12,000.00	10,000.00	5,000.00
3. Roadway excavation	87,000 c.y.	.38	.47	.40
4. Structural excavation	5,900 c.y.	1.60	1.50	2.00
5. Ditch and channel excavation	2,400 c.y.	.80	.50	1.25
6. Overhaul	532,500 sta.y.	.005	.005	.01
7. Imported borrow, type A	145,000 c.y.	.93	1.10	1.50
8. Imported borrow, type B	69,000 c.y.	.65	.62	1.00
9. Develop water supply and furnish water equipment	L.S.	1,000.00	1,000.00	2,500.00
10. Apply water	7,200 M gal.	2.00	1.50	1.50
11. Finish roadway	L.S.	4,000.00	5,000.00	6,000.00
12. Crushed gravel base	40,000 ton	2.10	2.17	2.50
13. Sand prime coat and penet. treatmt.	250 ton	3.50	3.50	5.00
14. Liquid asphalt, SC-2, prime coat and penet. trtmt	125 ton	20.00	20.00	20.00
15. Mineral aggregate plant-mix surf.	18,500 ton	3.40	3.90	2.50
16. Paving asph. plant-mix surf	925 ton	20.00	18.00	20.00
17. Asph. emulsion seal coat and paint binder	98 ton	30.00	25.00	30.00
18. Screen seal coat	1,430 ton	3.30	4.00	5.00
19. Timber structures	49 Mbm	125.00	120.00	200.00
20. Class A port. cem. conc. struct.	560 c.y.	26.50	35.00	50.00
21. Monuments	110 ea.	3.50	3.00	4.00
22. Laminated guard railing	360 l.f.	2.00	2.00	2.50
23. Timber barrier railing	380 l.f.	1.50	1.50	3.00
24. Culvert markers	86 ea.	3.00	3.00	3.50
25. Guide posts	160 ea.	3.00	3.00	3.50
26. Move and reset fences	2.7 mi.	500.00	550.00	1,250.00
27. 12-in. non-rein. conc. pipe (2,000-D)	1,272 l.f.	2.00	1.75	1.70
28. 18-in. pipe, as above	1,920 l.f.	2.25	2.75	3.00
29. 24-in. pipe, as above	387 l.f.	4.00	4.00	6.00
30. 30-in. pipe, as above	297 l.f.	5.00	5.00	7.50
31. 36-in. pipe, as above	399 l.f.	7.00	7.00	11.00
32. Cement treated backfill	340 c.y.	7.00	15.00	20.00
33. Salvage pipe culverts	1,300 l.f.	.80	.75	1.25
34. Relay salvaged pipe	500 l.f.	.60	.75	1.25
35. Timber spillways	16 ea.	15.00	25.00	25.00
36. Timber down drains	100 l.f.	.80	1.00	1.25

Timber Construction
BEATS DEADLINE — CUTS ESTIMATE
For Army



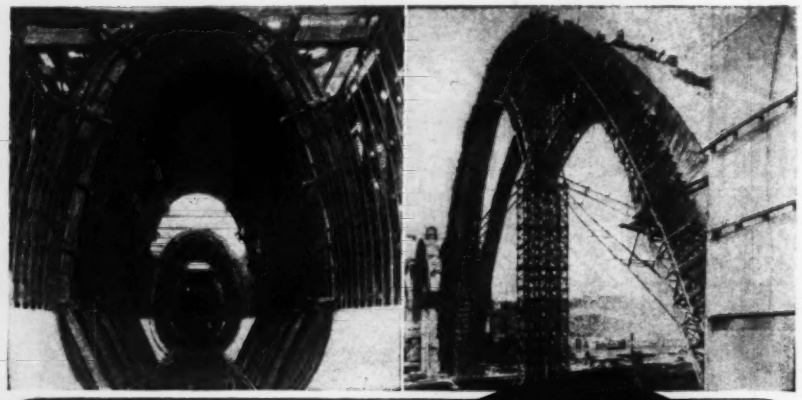
The TECO Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood.

The Army's new Echelon Motor Base in Georgia, was completed two and a half months ahead of schedule—costing but 90 per cent of original estimate in spite of overtime. One of the largest timber-trussed buildings in the South — 493 forty-foot TECO connected trusses—it provides training space for 2,000 men.

This building is an example of the hundreds of wartime structures now being speeded to completion with Timber and the TECO System of Construction. Write for new FREE Book on timber fabrication.

Timber ENGINEERING COMPANY

WASHINGTON D. C. — PORTLAND, OREGON



for Speed in Construction

The rapid progress of engineering construction has naturally influenced the design of Blaw-Knox Steel Forms with respect to their general application and operation.

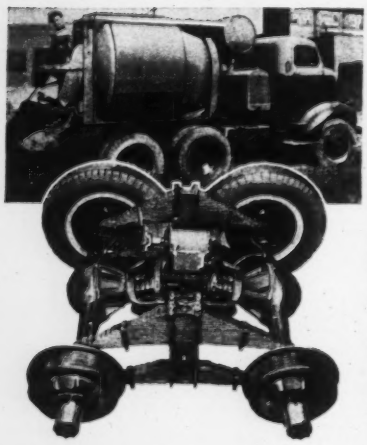
The engineering facilities and services extended by Blaw-Knox form engineers are prized by all who have taken advantage of them. These services are offered in the interest of engineering progress and are free from any charge or obligation.

BLAW-KNOX STEEL FORMS

BLAW-KNOX DIVISION
of Blaw-Knox Company
Farmer's Bank Bldg. Pittsburgh, Pa.
New York Chicago Philadelphia Birmingham

RUGGED and DEPENDABLE HEAVY-DUTY TRUCKS from SMALLER UNITS

. . . and Uncle Sam Approves!



YOU NEED BIG-CAPACITY, HUSKY TRUCKS for today's jobs . . . but you can't buy standard equipment of this type now.

QUITE A PROBLEM? NO!

For years successful operators with tough, difficult, heavy duty, on or off-the-highway hauling problems have saved time, money, men and material with

THORNTON Four-Rear-Wheel DRIVE

From coast to coast in the U. S. A. and in countries all over the world, 1½ to 3-ton trucks have been converted with THORNTON units into DURABLE, FLEXIBLE, HEAVY DUTY VEHICLES that out-pull, out-last and out-maneuver standard trucks costing double or more.

Put TWO driving axles under the load instead of one, double the gear speeds, better springing and load flotation, with vastly superior tractive ability . . . all of this for less money!

Government approval? Yes, up to now. But these things are subject to change . . . so act quickly. Contact your nearest Truckstell-THORNTON dealer, or wire factory direct. Trained men will engineer this equipment to the requirements of YOUR PARTICLAR JOB.

THORNTON TANDEM CO.
8729-8779 GRINNELL AVE. DETROIT, MICH.
Manufacturers also of the THORNTON automatic-locking DIFFERENTIAL
"When you need TRACTION you need THORNTON"

ABOUT MEN

Joseph Smith has resigned as superintendent of the municipal waterworks at Upper Sandusky, Ohio, to take a post with the Findlay, Ohio, water plant.

John S. Lochhead, formerly an engineer with the Dominion Bridge Co., Montreal, Canada, has joined the staff of Defense Industries Limited, also of Montreal.

Hugh Danahy, assistant city engineer at Hibbing, Minn., has been named acting engineer during the absence of **James Rough,** who has entered military service as a captain in the Corps of Engineers.

Charles A. Spiegel, of Cambridge, Mass., has been promoted to the rank of captain in the Corps of Engineers.

O. G. Leaply, bridge engineer for the Wayne County (Ohio) highway department, has resigned to take a post with the Holmes Construction Co., of Worcester, Mass.

Mark P. Wynkoop, division engineer at Valley City, Minn., has been appointed North Dakota State Highway Engineer to succeed **Z. E. Sevison,** who recently resigned that post.

R. S. Collins, of New Bern, N. C., has been commissioned a captain in the Corps of Engineers.

Maj. Karl M. Pattee, area engineer for Camp Campbell, Ky., has been transferred to another war project, and will be succeeded by **Maj. M. S. Webb,** formerly of Nashville, Tenn.

R. C. Fye, maintenance office engineer of the Iowa State Highway Commission, has been commissioned a lieutenant in the Navy and has reported for duty at Norfolk, Va.

Maj. William H. Baker, lately in charge of Port Townsend for the Seattle district office of the U. S. Engineers, has been transferred to the North Pacific division at Portland, Ore. His place at Port Townsend will be taken by **Capt. Frank S. Hale.**

W. W. Finley, assistant division engineer at Forth Worth for the Texas State Highway Department, has been called to active service as a captain in the Corps of Engineers. He will be stationed at Tulsa, Okla.

G. W. Prater, former maintenance engineer for the Tennessee State Highway Department, has been named division engineer for the Knoxville division, succeed-

AND JOBS

ing **W. T. Brooks**, now chief engineer of the department.

William Lambe, Raleigh, N. C., has been employed by the University of New Hampshire at Durham, N. H., as an instructor in the engineering department.

J. M. M. Lamb, of St. John, N. B., has been appointed marine agent of the dominion transport department for the St. John district. He succeeds **H. F. Morrisey**, also of St. John, who died recently.

J. Lyter Donaldson, Kentucky state highway commissioner, has been appointed a member of a five man board studying tire rationing under National Price Administrator Leon Henderson.

Walter V. Thomas has been appointed county engineer for Leavenworth County, Kan., succeeding **Kenneth Stone** who recently entered army service.

Matthews H. Tardy, former Birmingham, Ala., architect, has been commissioned a captain in the Corps of Engineers.

R. L. Boyce, of Holdrege, Neb., has been appointed chief engineer in charge of construction at the Sioux City, Iowa, air base.

J. S. Kaumeyer, of Chippewa, and **John Gardner**, of Welland, Ont., have been appointed members of the Buffalo and Fort Erie Public Bridge Authority.

William H. Smith, WPA area engineer at New Hampton, Iowa, has been transferred to Iowa City where he will be in charge of work in 25 counties in the southeastern part of the state.

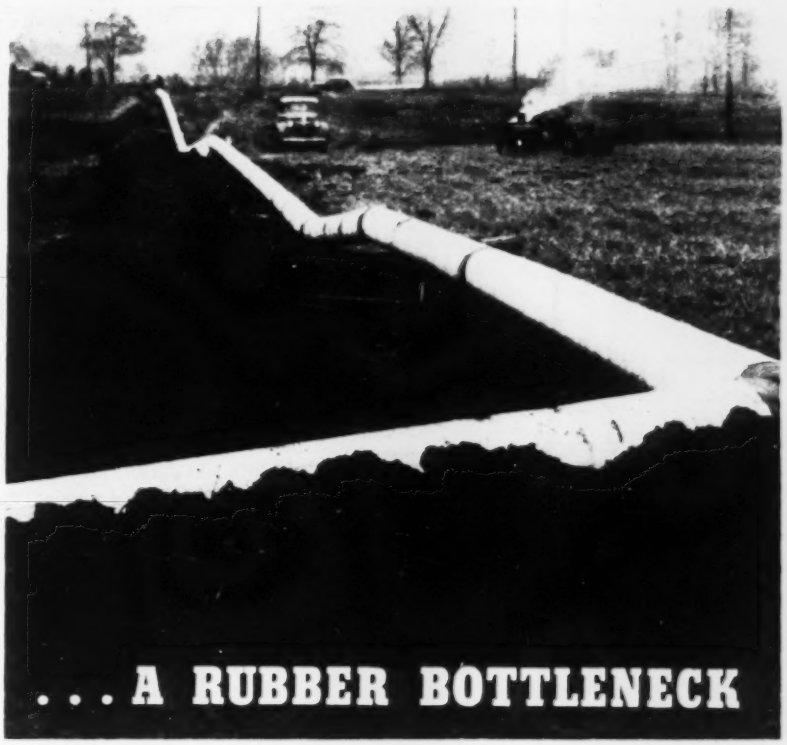
G. H. Grimes, of Monroeville, Ala., formerly an engineer for the traffic and planning section of the Louisiana Department of Highways, has been promoted to the rank of first lieutenant in the Corps of Engineers.

H. M. Werbitzky has been appointed acting division engineer for Division 9 of the Missouri State Highway Department, with headquarters at Willow Springs.

Maj. Harry D. Lovering has been transferred from the U. S. District engineer office at Grand Island, Neb., to Denver, Colo.

Ben F. Leslie, assistant engineer of Surveys and Plans for the Missouri State Highway Department, has been appointed acting division engineer for Division 2 at

STEEL PIPE HELPS STRETCH



. . . A RUBBER BOTTLENECK

America needs synthetic rubber. You can help speed up vital plant construction by using ARMCO Spiral Welded Pipe for water lines, process piping and prefabricated fittings. It assures a first-class job and gives you important savings of time, labor and metal.

For one thing you can specify the one right size in any diameter from 6 to 36 inches. Wall thicknesses range from 9/64 to 1/2-inch. By designing to meet your needs *exactly* you save precious steel for the war effort.

You'll see other advantages in the uniform lengths of up to fifty feet. There are fewer joints to assemble and fewer sections to unload, haul and string. For plant piping you can get standard or special fittings that come welded to straight pipe runs. This eliminates a pair of flanges at every bend, reduces weight and saves hours of costly assembly.

Also consider ARMCO Spiral Welded Piles for fast, accurate foundation work. They are known for their strength and straight driving with the least time and effort.

ARMCO Spiral Welded Pipe is being used successfully in synthetic rubber plants now building. Write us today for quotations and shipping promises. The American Rolling Mill Company, Pipe Sales Division, 2881 Curtis Street, Middletown, Ohio.

ARMCO SPIRAL WELDED PIPE

PREPARED!

With the influx of new workers into war-plant communities...

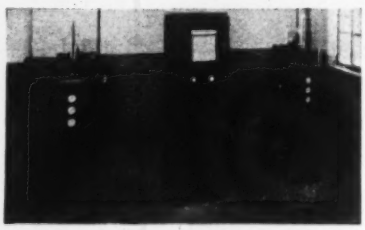
CHLORINATION AGAIN PROVES ITS VALUE AS A SEWAGE PLANT *SAFETY RESERVE*

The sudden, unexpected population growth now taking place in many communities is putting an extra burden on sewage treatment facilities right at a time when expansion is impossible or subject to serious delay.

Yet many of these communities have found it possible to "carry on" without lowering their sanitary standards, and without creating objectionable conditions around the plants.

The answer is the SAFETY RESERVE they have in modern W&T Chlorinators. Though this equipment may have been used only in an auxiliary way under *normal* conditions, it was ready and waiting to raise the efficiency and effective capacity of the plant in the face of the abnormal load.

Peak loads . . . drought conditions . . . hot spells . . . breakdowns in equipment which cannot be immediately replaced . . . these and other emergencies are being more easily overcome where W&T Chlorinators are an integral part of the plant installation. SA-138-S



W&T Chlorinators meet the needs of all types of sewage treatment plants. Application may be controlled manually, automatically (proportional to flow) or on a programmed "step-by-step" basis. And with W&T *potential chlorination*, changes in both strength and flow of sewage are instantly met with proper changes in the application rate.

"The Only Safe Sewage is a Sterilized Sewage"

WALLACE & TIERNAN CO., Inc.

MANUFACTURERS OF CHLORINE AND AMMONIA CONTROL APPARATUS
NEWARK, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

FASTER • BETTER • STRONGER

HYDRO-TITE FOR BELL & SPIGOT PIPE JOINTING

Hydro-Tite is a dependable self-caulking sulphur-base compound for jointing water mains and soil pipe—costing less than lead—requiring no skill to make tight joints. Same crew can lay more pipe per day. Stands deflection and vibration. In use 30 years without failure.

Write for Jointing Book.

HYDRAULIC DEVELOPMENT CORP.
50 CHURCH STREET — NEW YORK, N. Y.

Macon. **A. L. Wallace** succeeds Leslie in his former job.

E. B. Cavallo, formerly construction engineer with the Mississippi State Highway Department, is now assistant area engineer for the Corps of Engineers at Vicksburg, Miss.

Henry Pfutzenreuter, Chicago, Ill., engineer, has been appointed project manager for the construction of a defense base near Ottumwa, Iowa.

P. R. Rosen, city engineer at Aberdeen, Wash., has resigned to accept a commission as a first lieutenant in the Corps of Engineers.

Melvin H. Boots, head draftsman in the bridge department of the Mississippi State Highway Department, has resigned to accept a post with Wyatt C. Hedrick, Inc., architectural-engineering firm of Fort Worth, Texas.

Charles MacIntosh Noble, former Jacksonville, Fla., engineer, has been commissioned a lieutenant commander in the Naval Engineering Corps.

Henry C. Jones, district maintenance supervisor of the Idaho State Bureau of Highways office at Lewiston, has resigned to enter military service.

C. W. Snyder has been promoted to the position of assistant chief engineer for the Hanlon-Waters Co., of Tulsa, Okla.

Neil B. Nelson, office engineer in the Pierce County, Wash., road engineer's office, has been granted a leave of absence to engage in defense work.

Capt. William E. Grubb, area engineer for the O'Reilly General Hospital at Springfield, Mo., has been transferred to McCook, Neb., as area engineer on a project there.

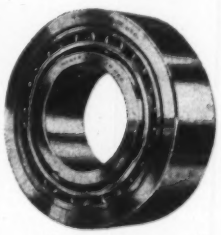
Ben W. Schubert, engineer of Boise, Idaho, has been added to the priorities staff of the district War Production Board office in that city, as a priorities analyst.

Leslie J. Reardon, until recently a construction engineer for army air bases in Trinidad, and formerly chief engineer for the Structural Clay Products Institute, has been appointed assistant professor of mechanics at Case School of Applied Science, Cleveland, Ohio.

Harold R. Reynolds, Jr., formerly structural draftsman and designer with Frederick R. Harris, Inc., of New York City, is now an ensign in the Naval Engineering Corps at Norfolk, Va.

Walter Scott, Jr., of Charlotte, N. C., has been promoted to the rank of lieutenant colonel in the Corps of Engineers.

YOUR ROLLER BEARINGS HAVE A BIG JOB TO DO. DON'T NEGLECT THEM! KEEP THEM CLEAN . . . WELL LUBRICATED . . . PROPERLY ALIGNED! THIS IS NO TIME TO TAKE CHANCES!



WHILE anti-friction bearings keep factory wheels turning, transportation rolling and farm machinery producing, they have the added wartime job of keeping armies on the go, aircraft aloft and battle fleets afloat.

Vital to the arming, transporting and feeding of our forces . . . with Victory demanding round the clock operation, day after day . . . even sturdy bearings like Hyatts, *which run for long periods without attention under normal conditions*, need a little care today.

Be sure bearings are properly sealed and lubricated. Be sure bearings fit snugly...for looseness might cause excessive wear and misalignment. Keep bearings free from grit and dirt both in assembly and in operation.

With Hyatts assigned to two important jobs: beating friction and helping to beat the Axis...don't neglect them! Our Engineering Department will be glad to help you on any bearing application or maintenance problem.

Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

THIS IS THE 50TH YEAR OF HYATT ROLLER BEARINGS

Three Carloads of Bad News for the Axis . . .

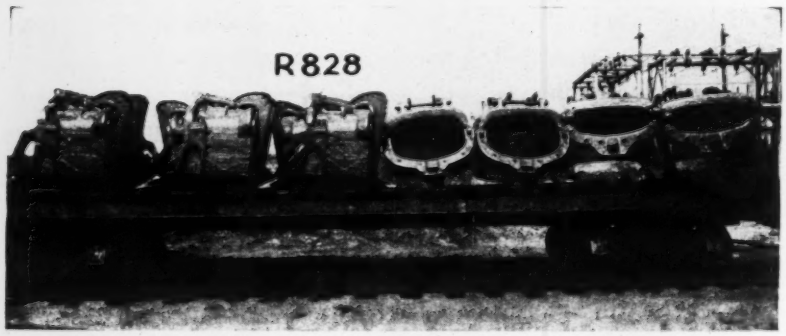
Any equipment that increases production or speeds construction of war projects and does so with a minimum of maintenance and power consumption, is bad news for the "Unholy Three".

Amsco Renewable Lip Dippers qualify, for they are shaped for fast cutting, easy loading and clean dumping of materials. Made of 13% manganese steel throughout,' they defy breakage and wear, resisting the abusive knocking-about they must necessarily undergo; and, work-hardening on the surface, they withstand abrasive wear and require least maintenance.

The readily renewable lip, which receives the brunt of the wear, can be replaced without discarding an entire front casting. The lip is keyed to the front; and secured to the back by "U" bolts internally, on each side, so that the whole forms a rigid unit.

Scores of these fast digging, long-lasting dippers are at work on far flung war projects. Over 3,500 Amsco Renewable Lip Dippers have been placed in service since they were first made in 1930. Added to those at work will be thirty more; three carloads, one of which is pictured here, of 1½ and 1¾ cu. yd. dippers made for a power shovel manufacturer.

They'll soon be throwing up breastworks for the bastions of democracy, in the race against time. They are on the winning side—knowing these dippers, the many shovels they are used on and the men that operate them, as we do. Know more about Amsco Dippers for construction, pit work and stripping — they are on exhibit in Bulletin 641-D.



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AMERICAN MANGANESE STEEL DIVISION
OF THE AMERICAN BRAKE SHOE & FOUNDRY CO.
Chicago Heights, Illinois

Genuine Manganese Steel, "The Toughest Steel Known"
Chromium-Nickel Alloy Castings for heat and corrosion
Power Shovel Dippers. Dredge and Industrial Pumps
Welding Materials for reclamation and hard-surfacing

FOUNDRIES AT CHICAGO HEIGHTS, ILL., NEW CASTLE, DEL., DENVER, COLO., OAKLAND, CALIF., LOS ANGELES, CALIF., ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

MEETINGS

AMERICAN WELDING SOCIETY, annual meeting, Hotel Cleveland, Cleveland, Ohio, Oct. 12–15.

AMERICAN SOCIETY OF CIVIL ENGINEERS, Fall meeting, jointly with the Engineering Institute of Canada, Hotel General Brock, Niagara Falls, Ontario, Oct. 14–15.

NATIONAL RECLAMATION ASSOCIATION, Denver, Colo., Oct. 14–16.

AMERICAN PUBLIC WORKS ASSOCIATION, Cleveland, Ohio, Oct. 18–21.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION, Hotel Sherman, Chicago, Ill., Oct. 20–22.

NATIONAL SAFETY COUNCIL, 31st National Safety Congress and Exposition, Chicago, Hotel Sherman, La Salle and the Morrison. Convention headquarters in the Sherman, Oct. 27–29.

AMERICAN PUBLIC HEALTH ASSOCIATION, St. Louis, Mo., Oct. 27–30.

FEDERATION OF SEWAGE WORKS ASSOCIATIONS, 3rd annual convention, Hotel Statler, Cleveland, Ohio, Oct. 22–24.

INSTITUTE OF TRAFFIC ENGINEERING, Sherman Hotel, Chicago, Ill., Oct. 25–26.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS, 8th annual meeting, Claypool Hotel, Indianapolis, Oct. 31.

INDUSTRIAL HYGIENE FOUNDATION, 7th annual meeting, Mellon Institute, Pittsburgh, Pa., Nov. 10–11.

REGIONAL AND LOCAL MEETINGS

WEST VIRGINIA SOCIETY OF PROFESSIONAL ENGINEERS, annual meeting, Kanawha Hotel, Charleston, W. Va., Sept. 25–26.

SOUTH DAKOTA WATER AND SEWAGE WORKS CONFERENCE, 8th annual meeting, Huron, S. D., Sept. 28–29.

Regional War Time Conference, jointly sponsored by FOUR STATES SECTION and NEW JERSEY SECTION of the AMERICAN WATER WORKS ASSOCIATION and the PENNSYLVANIA WATER WORKS OPERATORS' ASSOCIATION, Benjamin Franklin Hotel, Philadelphia, Pa., Oct. 7–9.

SOUTH DAKOTA RECLAMATION ASSOCIATION, annual convention, Pierre, Oct. 8–9.

SOUTHWEST SECTION, AMERICAN WATER

POSITIVE CONTROL FOR ACCURATE BUCKET SPOTTING

Koehring Independent Boom Control

saves seconds on material handling work. Independent boom control permits accurate spotting of concrete buckets for high speed concrete placing on building construction projects. Raising or lowering the boom while swinging or traveling is a second-saving feature. Koehring Cranes are high speed, easy handling, have accurate and positive control. The many time-saving advantages of Koehring means speed on the job, more work per shift, less man power . . . waste motion is reduced to a minimum, every move is a production move.

KOEHRING COMPANY
MILWAUKEE • WISCONSIN

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

3/16
3/16
VICTORY CODE
No cuneiform writing, this odd character. It is a code symbol—the code of the welder. Here truly is a victory code, for it is a familiar language in an industry devoted 100% to winning the war. We know that, for we are part of it — and proud of it.
★
MISSISSIPPI VALLEY STRUCTURAL STEEL CO.
MELROSE PARK, ILL. DECATUR, ILL. ST. LOUIS, MO.

Hayward Buckets

Use this Class "E" Clam Shell Bucket for handling crushed stone, gravel, sand and other bulk materials.

THE HAYWARD CO., 48-50 Church St., N. Y.

DE LAVAL STEAM TURBINE CO. TRENTON, N.J.

Manufacturers of

STEAM TURBINES . . . HELICAL and WORM GEARS . . . PUMPS: Centrifugal, Propeller, Clogless, Mixed Flow, Rotary Oil . . . Pump Priming Systems . . . CENTRIFUGAL BLOWERS and COMPRESSORS.

WORKS ASSOCIATION, War-Time Conference, Little Rock, Ark., Oct. 12 [illegible]

NEW YORK SECTION, AMERICAN [illegible]ATER WORKS ASSOCIATION, fall meeting, Hotel DeWitt Clinton, Albany, N. Y. Oct. 15–16.

MISSOURI VALLEY SECTION, AMERICAN WATER WORKS ASSOCIATION, Wartime Conference, Coronado Hotel, St. Louis, Mo., Oct. 23–24.

AMERICAN WATERWORKS ASSOCIATION, California Section, 23rd annual convention (War Conference), Oakland Hotel, Oakland, Calif., Oct. 28–31.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA, Third Annual Water Conference, Wm. Penn Hotel, Pittsburgh, Pa., Nov. 9–10.

Elections and Activities

DARRELL BLAKE, Pottawattamie county (Iowa) engineer, was recently elected president of the Iowa County Engineers Association. L. W. Croft, Dallas county engineer, was elected vice president and Frank O. Laing, Polk county engineer, was elected secretary-treasurer.

W. GERRY PRUETT, director of highways for Alabama, has been elected vice president of the Southeastern Association of State Highway Officials. W. Vance Baise of Raleigh, is president.

MEASURES for cutting manpower wastage in the face of a threatened labor shortage will be detailed at the seventh annual meeting of the Industrial Hygiene Foundation, to be held at the Mellon Institute, Pittsburgh, Pa., Nov. 10–11. The program will drive for action in reducing the approximately 2½ million days war workers are losing weekly because of illness and non-industrial injuries.

THE keynote of the fall meeting of the New York Section of the American Water Works Association will be "Conference on War Time Water Works Problems," with special reference to the maintenance and operation of water supplies under war time conditions and mutual aid plan for water service. The meeting is scheduled for the Hotel DeWitt Clinton, Albany, N. Y., Oct. 15–16.

JOHN C. PAGE, commissioner of the United States Bureau of Reclamation, and Abe Fortas, Under-Secretary of the Department of the Interior, will be speakers at the annual convention of the South Dakota Reclamation Association, to be held at Pierre, Oct. 8–9.

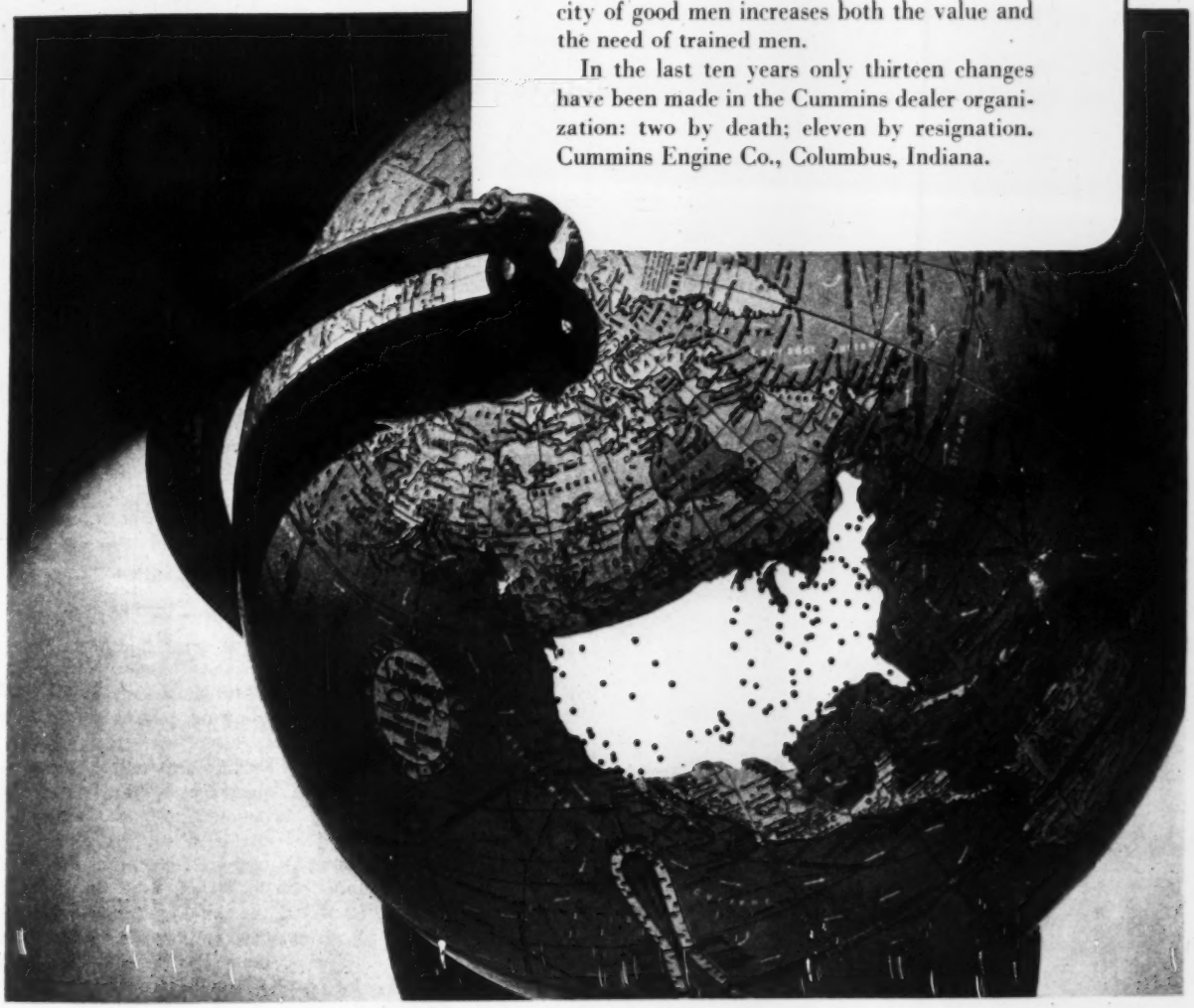
What CUMMINS Dependable DIESEL Service MEANS TO YOU

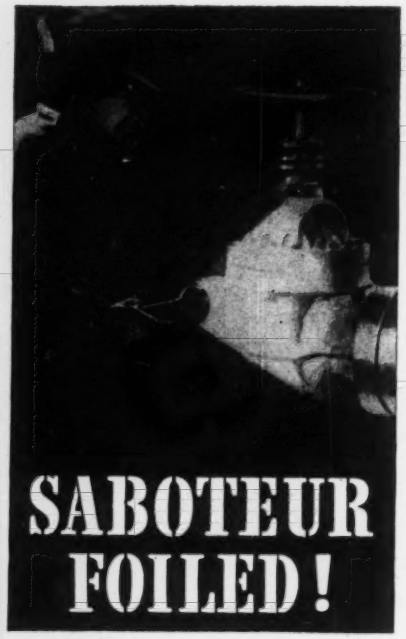
Cummins customer service policy, when it was inaugurated nine years ago, took into consideration both normal and abnormal conditions . . . that's why first consideration was given to the customer's needs and these basic principles adopted:

1. To save customer time, complete parts stocks were made available, at centrally located points, in the territories where Cummins Diesels were working.
2. To assure competent service, at a moderate cost, uniform methods and factory trained men were provided.
3. To attract an intelligent group of dealers, incentives were arranged that guaranteed a permanent organization.

The war has shown the soundness of this policy . . . the limited supplies and close controls set up by the government make it necessary to eliminate useless duplication of parts stocks—a policy Cummins *has always followed*. The scarcity of good men increases both the value and the need of trained men.

In the last ten years only thirteen changes have been made in the Cummins dealer organization: two by death; eleven by resignation. Cummins Engine Co., Columbus, Indiana.





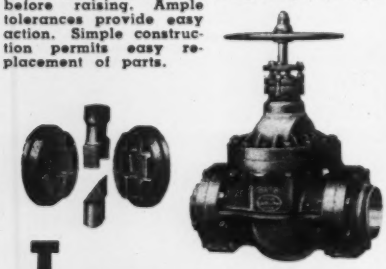
SABOTEUR FOILED!

There's an invisible saboteur at work, in your plant, every day of the year! . . . the destructive force of rust, scale and corrosion that cripples your valves and other metal equipment.

Ludlow Valves are made of the best materials—built to stand up under long years of use. That's why Ludlow Valves installed years ago are able to meet the tough requirements imposed by today's abnormal service—*without time out for repairs!* Employing the famous double-disc, parallel seat principle, developed and perfected by Ludlow, these rugged valves work smoothly, close securely—even after years in the open position. In peace or war, *Ludlow means value in valves.* Send for Catalog.

THE LUDLOW VALVE MFG. CO., INC.
Troy, New York

Construction Features: Self-releasing 30° angle wedges and free floating gates, self-adjusting to seats, afford smooth, trouble-free performance, long service. Rings are cleaned throughout stroke action. Gates are wedge-locked directly opposite ports and completely unwedged before raising. Ample tolerances provide easy action. Simple construction permits easy replacement of parts.



LUDLOW VALVES

SINCE 1866

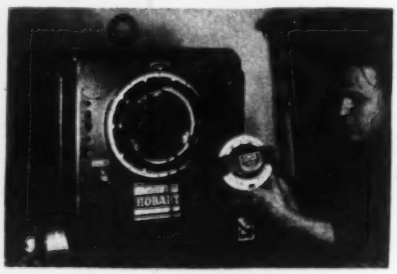
New Aids to the Constructor

Equipment and material announcements and manufacturers' news

Universal Floodlights

A new line of inexpensive, lightweight, weather-tight, porcelain enamel floodlights for general and protective lighting construction work and industrial plants, is announced by Westinghouse Electric & Mfg. Co. These highly efficient units are available in four sizes: the E-8 for 75 to 100 watt lamps; E-12 for 150 to

200 watt lamps; E-14 for 300 to 500 watt lamps, and the E-16 for 750 to 1000 watt lamps. The one-piece reflector housing is made from heavy gage sheet iron with a durable porcelain enamel finish. The E-8 and E-12 are particularly recommended by the manufacturer for street and sewer repair work, protective lighting of driveways and garages, and entrances to industrial plants. The larger E-14 and E-16 units are designed for protective floodlighting of industrial plants, floodlighting for night construction projects, and lighting freight terminals and docks.—*Westinghouse Lighting Division, Edgewater Park, Cleveland, Ohio.*

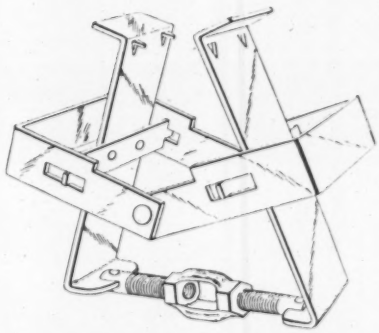


Remote Control

A new remote control unit, now a standard production feature of all welders offered for sale by Hobart Brothers Co. is shown. This improved control is protected fully from accidental breakage by a metal pull-out handle set over the control dial, and by cushioned springs on the back of the porcelain rheostat. The new dial, it is believed, will increase weld qualities—especially welds made under modern high speed techniques.—*Hobart Brothers Co., Troy, Ohio.*

Brackets

Barricades, carpenter horses and high or low staging horses of the knock-down type can be quickly made and lumber saved with the new M&M horse bracket. The brackets are said to be practical for all types of horses or barricades, which can be put together or taken down for hauling, storing or moving in a fraction of a minute through use of the product, the manufacturer claims. Lumber used is salvaged 100 percent and may be used up on the job or stored for future use. The brackets eliminate the use of some-



times clumsy nailed-up horses which are difficult to handle, haul or store. The brackets are made of 10-gage hot-rolled strip, is ⅛ in. thick and able to stand hard handling.—*M&M Wire Clamp Co., 983 17th Ave. S.E., Minneapolis, Minn.*

Lamp Starter

A new manual-reset fluorescent lamp starter, called the "Master No Blink," that locks dead lamps out of the circuit, thus allowing instant dead lamp replacement, has been announced by General Electric's appliance and merchandise department. The starter offers several advantages over the automatic type. In automatic starters a flow of current is required to keep the dead lamp from flickering. With the "Master No Blink", the manufacturer says that no current flows through the ballast after the dead lamp has been locked out. This current cut-off feature prolongs life

ON GUARD FOR THE DURATION

★ Your HEIL serviceman helps keep your dirt-moving equipment operating efficiently

With Heil Quality-built Equipment you have a head start in "performance insurance". Every feature of Heil products is designed to provide outstanding service and life. Constant improvements are being made, even today, to prolong the already famed ability of Heil equipment "to take it and ask for more".

We don't have to remind you that such small items of care as greasing your sheaves and other moving parts regularly . . . watching your cutting blade, and reversing or replacing it before the bottom of the bowl starts to wear . . . using a good quality cable . . . watching your hydraulic equipment closely for tell-tale leaks that indicate a worn fitting . . . checking the rod wipers frequently . . . paying special attention to the hoses . . . noting worn parts and reenforcing or ordering replacement parts in advance to save costly tie-ups later . . . taking advantage of the facilities of your nearest Heil distributor . . . all pay extra dividends in prolonged performance and operating efficiency.

Preventive maintenance is a sound investment, paying you back in "extra hour performance". See your Heil distributor for prompt service and genuine repair parts —he's "on guard for the duration" to protect your investment in Heil Quality-built equipment.

See him, too, on equipment to be mounted on used tractors or trucks . . . or completely new units (provided you have the necessary releases). You'll find your Heil distributor anxious to be of assistance to you—take advantage of his facilities soon.

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE, WISCONSIN

PROTECT
Your Valuable Defense Tracings

with

HAMILTON VICTORY UNITS

Hamilton's new Victory Wood Filing Units save steel for war needs, but still you get conveniences . . . and protection for your valuable defense tracings . . . formerly found only in steel units.

- Pantasote Dust Covers
- Roller Drawer Construction
- Safety Drawer Stops
- Locking Device on all units

TYPICAL STACK

- Look like Steel Units
- Interlock with Steel Units
- Work like Steel Units

Hamilton

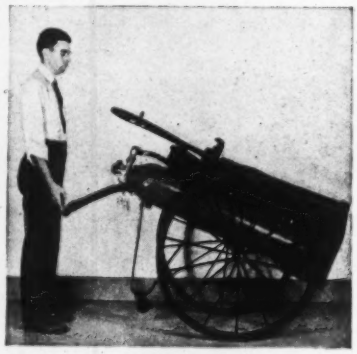
MANUFACTURING COMPANY
TWO RIVERS WISCONSIN

Hamilton DRAFTING ROOM FURNITURE

of the ballast and eliminates the "cooling" period which is required for replacement of lamps using automatic starters.—*The General Electric Co.*, 570 *Lexington Ave., New York, N. Y.*

Fire Fighter

This Alfite carbon dioxide fire engine is said to be the only 100 lb. engine approved by Underwriters and Associated Factory Mutual Laboratories for use on both electrical and oil fires. It is equipped with an Anti-Statik horn to protect the operator from static charge, and is designed for balance at wheeling height, has a third swivel wheel for easy



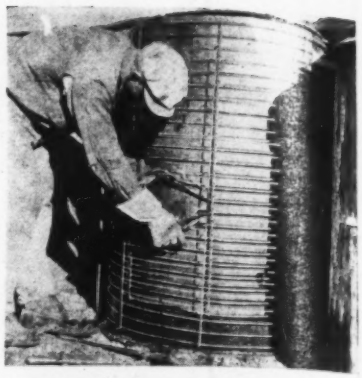
maneuvering, and a retaining latch which releases horn instantly, yet holds it firmly in place when not in use. The apparatus is recommended for fires in flammable liquids, alcohol storage, electrical machinery and for other class "B" and "C" fires. It smothers fire instantly with carbon dioxide gas.—*The American LaFrance-Foamite Corp., Elmira, N. Y.*

Tank Coating

Carbo Petro-Non-Solv has been developed by the Carbozite Corp. to answer the demand for a coating to protect concrete or wood storage tanks against the infiltration by gasoline and oil. This new coating contains no oil, therefore it will not saponify when in contact with cement or mortar. One of the product's assertedly unique features is its absolute inertness to petroleum, coal tar and manufactured solvents, organic and inorganic oils and fatty acids. The product is said to dry hard within two or three hours, and two or three applications are recommended, depending upon the porosity of the surface to which it is applied.—*The Carbozite Corp., First National Bank Bldg., Pittsburgh, Pa.*

Water

The Dixie-Vortex Co. has developed a portable sanitary water bucket, to be used "on the job" in construction work and in large plants to save time of men at work, and insure sanitary condition of the water available. A portable tank,



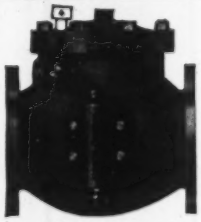
TOUGHEST TEST
of Welded Fabric Quality

Clinton Welded Fabric is the choice of experts for circular and other concrete shapes. UNIFORMITY, both in welding and in tensile strength, raises performance standards and assures maximum strength at welds. *Every step* in manufacture is completed in our own plant From blast furnace to wire, to electrical welding, it is supervised and tested by our own experts. Clinton Welded Fabric comes in sheets or rolls, cut to your *exact* job specifications . . . saving you the time, trouble, and expense of on-the-job cutting and placing. Wickwire Spencer Steel Company, 500 Fifth Avenue, New York, N. Y.

WISCO PRODUCT

CLINTON REINFORCING FABRIC
It's Electrically Welded
WICKWIRE SPENCER

GOLDEN-ANDERSON...
...FOR ALL TYPES OF WATER CONTROL...
... CUSHIONED SWING CHECK VALVES!



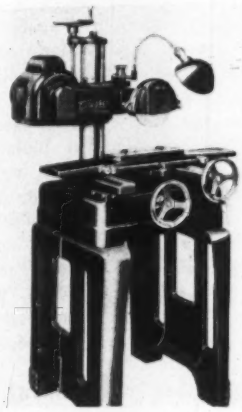
To be used on air compressor lines, water lines, etc. . . . . a swing check valve, properly designed for balanced operation, assuring a full pipe line flow with minimum pressure drop. Especially arranged with cushion chamber on the side to prevent slapping or banging of disc against seat on reverse flow. Comes in 4" to 36" sizes, with non-corrosive trim. In globe pattern. Catalog No. 28 covers this valve, and every other G-A valve . . . . write for your copy today.

GOLDEN-ANDERSON VALVE SPECIALTY CO.
PITTSBURGH, PA.

which can be carried up ladders or into excavations, to men on assembly lines and to those keeping vigilance over machines, the "water boy" is equipped with a container for cups, and water is released through a spigot for easy delivery.—*Dixie-Vortex Co., 24th St. and Dixie Ave., Easton, Pa.*

Hydraulic Drilvise

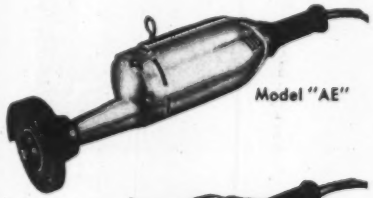
A new hydraulic Drilvise—an automatic vise for drill press work, and hundreds of other operations—has been brought out by the Studebaker Machine

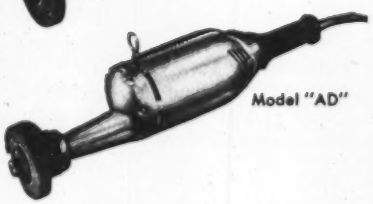


Co. By foot-operated levers Drilvise gives any holding grip from contact to more than 10,000 lb. Foot pressure moves the rear jaw forward $\frac{3}{16}$ in. at a time until required grip is obtained. The apparatus handles all work, heaviest to lightest with safety and precision, according to the manufacturer.—*Studebaker Machine Co., 9 So. Clinton St., Chicago, Ill.*

Portable Grinders

Two new portable grinders have been added to the line of electric tools manufactured by Skilsaw, Inc. They are Model "AD" and Model "AE," 4 in. and 5 in. grinders, respectively. Both





are said to be especially engineered to meet today's high speed requirements on all grinding, wire brushing, polishing and buffing operations. Both the "AD"

Use R B & W Bolts and Nuts . . .

Quick-starting, quick-tightening because they are accurately, uniformly sized and threaded — and carefully inspected.

Vibration-resisting, shock-resisting because the manufacturing method insures extra strength, and all processing is controlled from raw rod to finished product.

EMPIRE

AND ALLIED FASTENING PRODUCTS . . . SINCE 1845

RB&W *Making strong the things that make America strong*

RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

Factories at Port Chester, N. Y., Rock Falls, Ill., Coraopolis, Pa.
Sales offices at Philadelphia, Chicago, Detroit, Chattanooga, Los Angeles, Portland, Seattle

"THROW YOUR SCRAP INTO THE FIGHT"

1½ H.P. GASOLINE POWERED UNIT

● Hand puddling methods are no match for this all-purpose, 9-job MALL Vibrator that will place a stiffer mix faster with important savings in cement, sand, water, and labor. MALL Vibrated concrete assures a better bond with reinforcement; it is free from honey combs and voids; it permits an earlier stripping of forms and makes a stronger, water-tight job.

8 other quickly interchangeable tools, for Concrete Surfacing, Pumping, Sanding, Wire Brushing, Sawing with Circular Saw, Drilling, Grinding and Sharpening Tools—make this easily portable unit easy to keep busy.

Write at once for full information. Learn how easily you can speed-up War Work with this MALL Vibrator.

★★Manufacturers of Portable Electric Saws, Drills and hundreds of other portable power tools and attachments

MALL TOOL COMPANY

7730 SOUTH CHICAGO AVE. CHICAGO, ILLINOIS

Offices and Distributors in Principal Cities

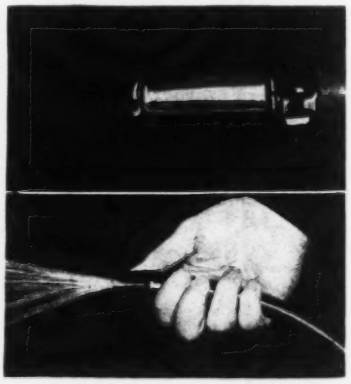
and "AE" models contain every feature of advanced design and sturdy construction essential to maximum performance and adaptability to a wide variety of applications. Ball bearings mounted in steel inserts on armature and extreme ends of wheel spindle absorb thrust, eliminate vibration and insure quiet operation.—*Skilsaw, Inc., Chicago, Ill.*

Humidifier

A new industrial humidifier, said to provide humidification and cooling by evaporation and air circulation, is announced by Carrier Corp. The humidifier provides humidified air, automatically controlled; cooling, by evaporation; tempering, cleaning and uniform circulation of air in addition to humidification. Providing ventilation by connection to outdoors, the equipment is particularly effective for blackout buildings. Features of the new humidifier include the suitability to any size plant, since it may be installed singly or in multiple. In addition, it requires no floor space, uses no distributing ducts, and is easily installed and moved to meet plant changes in production or machine layouts.—*The Carrier Corp., Syracuse, N. Y.*

Extinguisher Attachment

To fight certain fires—such as magnesium incendiary bombs and certain industrial fires—with a spray of water, the Pyrene Mfg. Co. has announced the "thumb-spray" nozzle attachment shown for converting present extinguisher equipment to wartime needs. The attachment simply clamps over the ⅜-in.

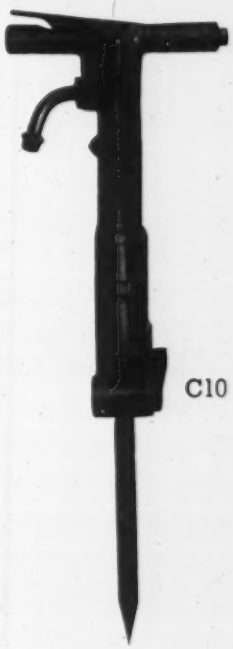


hose and nozzle of any standard soda-acid, foam, gas-cartridge or pump-tank fire extinguisher. The "thumb-spray" is a permanent attachment made of spring steel with a deflector edge that influences the range and distribution of the spray for maximum effectiveness. This safety device is a constant reminder to the operator to use a spray on certain industrial fires which can be approached within 6 or 8 ft., or to speed the burning and disposal of a magnesium bomb. —*Pyrene Mfg. Co., Newark, N. J.*

HERE'S WHAT YOU NEED *for that* PAVING BREAKER JOB

C7

C9



C10

ASSUMING that you already have a good compressor, you will want to select the right Cleveland Paving Breaker. Model C7 is the right tool for the average job. It weighs 80 lbs., and two C7's can be run from a Number 85 compressor. If the work is heavier, you may want to try out the C9, which sells at the same price as the C7, weighs two pounds more, but uses no more air. C9 is the slugger that is a winner in the toughest, reinforced, well-seasoned concrete. For the light job, for trimming, etc., you will select the small No. C10, the little fellow with the big wallop. Three C10's can be run from your No. 85 compressor. ★ Then for the accessories—"Clevaloy" chisels, moils, and miscellaneous paving breaker tools cost you a little more, but save money in the long run. Usually the 14" narrow chisels are selected. They cut more than moils, but cost no more. For air hose, specify Cleveland "Veribest"—It's tough and will stand the service. Costs no more than other first-class hose. Connect it with Cleveland Type "A" hose couplings—quick-acting, durable, and they don't waste your air. ★ Send for Bulletin 128 that tells you how to get the most work out of paving breakers at the least cost.

★

BRANCH OFFICES

Birmingham, Ala.	Dallas, Texas	Philadelphia, Pa.
Berkeley, Calif.	Detroit, Mich.	Pittsburgh, Pa.
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Chicago, Ill.	Milwaukee, Wis.	Victor, Colo.
Cincinnati, Ohio	New York, N. Y.	Wallace, Idaho
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The CLEVELAND ROCK DRILL CO.

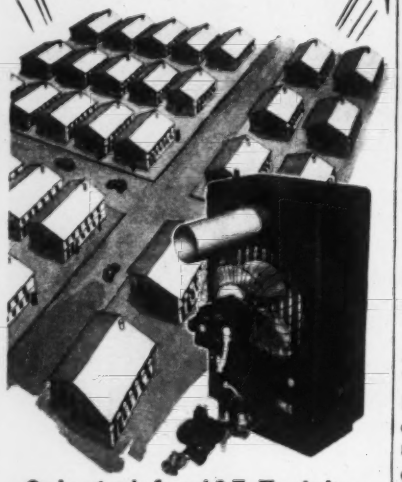
3734 EAST 78TH STREET • CLEVELAND, OHIO

CABLE ADDRESS • "ROCKDRILL"

LEADERS IN DRILLING EQUIPMENT

THE MOST HONORED UNIT HEATERS ARE

REZNOR



Selected for 165 Training Stations to Meet 3 Vital Requirements . . . . . .

The circumstances surrounding the selection of Reznor Unit Heaters for 165 camps are important. Groups of able engineers, architects, and contractors in charge of construction of Army and Navy stations, selected the make of heaters they preferred for their own projects. The decisions were supported by their broad experience and technical heating education. The fact that practically all of these well qualified groups preferred Reznor Gas Fired Suspended Unit Heaters certainly brings honor to the product. The selections of Reznor Heaters were based upon the same three vital requirements which also interest war production industries: long and dependable OPERATION, broad HEAT DISTRIBUTION, and quick INSTALLATION with savings in cost, labor, and vital materials. Write today.

REZNOR MANUFACTURING CO.
105 James St. Mercer, Penna.

"GAS HEATERS EXCLUSIVELY SINCE 1888"

Manufacturer's Activities

Personnel changes and new plans

ROY M. SMITH has joined the ROLLER-SMITH CO., of Bethlehem, Pa., as assistant chief engineer. Mr. Smith, formerly engineering manager for the BRYANT ELECTRIC CO.'s wiring device division, is a graduate of the University of Washington, and will devote the major portion of his time to design and application of the company's products.

A service flag for the 1,792 JOHNS-MANVILLE men now serving in the armed forces of the United Nations, was dedicated by LEWIS H. BROWN, president of the Johns-Manville Corp. at a recent ceremony.

CHARLES A. THOMPSON, of the Pittsburgh office of ROBINS CONVEYING BELT CO., has become a lieutenant in the United States Navy.

P. D. BLOCK, JR., has been elected to the board of directors of the INLAND STEEL CO., succeeding his father, the late P. D. Block. Mr. Block is assistant to the vice president in charge of raw materials and of Inland ore freighters.

R. J. LAIDLAW has been appointed manager of the Cleveland district office of the WORTHINGTON PUMP & MACHINERY CORP., succeeding A. J. KLUG, who will devote his time to special work. Mr. Laidlaw has been connected with the Worthington organization since 1919.

Production of the blast furnaces of the WICKWIRE SPENCER STEEL CO. during the first seven months of the year inset a new all-time high record in the creased 78 percent as compared with the corresponding period of 1941, and company's history, according to E. C. BOWERS, president of the organization. Larger production has also been achieved in the company's open hearth furnaces, as well as of both the bloom and rod mills. "While it is not permissible to give out exact figures," Mr. Bowers said, "we can announce that production of wire rope increased 24 percent during the first six months of the year. Output of coarse mesh wire cloth exceeded 73 percent, while production of spiral wire fabric, used in making conveyor belts, showed an increase of 43 percent."

NELSON M. JENKINS, formerly assistant superintendent of the tin house, TENNESSEE COAL, IRON & RAILROAD CO.'s tin plate mill, at Fairfield, Ala., has been appointed production superintendent at the RHEEM MFG. CO.'s plant in North Birmingham. Before coming to Birmingham, Mr. Jenkins was connected with the CARNEGIE-ILLINOIS STEEL CO.'s Pittsburgh office.

EDWARD F. EARLY, superintendent of the Morgan Works of the WICKWIRE SPENCER STEEL CO., has been named general superintendent of the Worcester, Mass., district of the company. In future, Mr. Early will have supervision over the Morgan and Goddard Works in Worcester and the Clinton, Mass., Works.

The ENERGY CONTROL CO., of which J. T. VOLLBRECHT is head, has been appointed flow meter representative for eastern Pennsylvania, southern New Jersey, Delaware, and Maryland, by the COCHRANE CORP. Energy Control Co. is located at 3107 No. Broad St., Philadelphia.

WILLIAM ROBERT ELDEN, 59, manufacturers' representative who lived in New York City, died at Teaneck, N. J., recently. At his death, he operated his own office in New York City representing SAUERMAN BROS., INC., of Chicago, and other manufacturers of material-handling machinery.

BERT DINGLEY, well known and colorful figure of the American automobile industry, recently was named president of the MARMON-HARRINGTON CO., INC., of Indianapolis, Ind. Mr. Dingley had been associated with the automobile field since its inception, and has recently been in charge of expediting the company's production of weapons for the United Nations.

LOUIS M. FUNDERBURG, formerly superintendent of the Leeds plant of UNIVERSAL ATLAS CEMENT CO., has been promoted to operating manager of the company's New York office. He will be succeeded at the Leeds plant by J. P. CAMM, formerly assistant superintendent.

ARTHUR W. THOMAS, for the past 15 years in engineering and sales work for the CHAIN BELT CO., of Milwaukee, has been loaned to the War Production Board as a consultant in the construction machinery division.

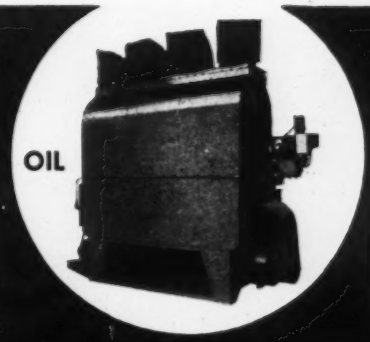
THOMAS MATCHETT, president of ROBINS CONVEYING BELT CO., has been appointed to the conveyor and mechanical power transmission industry advisory committee of the War Production Board. The company also announced recently the election of three additional vice presidents: R. W. EICHENBERGER and E. C. SALZMAN, of the home office, and J. F. MEISSNER who remains as manager of the Chicago office. HAROLD VON THADEN continues to be first vice president.

A. W. LANCASTER, (left) of Orillia, Ont., received first prize recently in the annual COMPRESSED AIR IN INDUSTRY CONTEST, for a paper describing the successful application of compressed air to increase the speed of producing cartridge cases by about 500 percent. LT. ALBERT J. NAUTA (right), of the Army Air Base, Daniel Field, Augusta, Ga., was awarded a second prize for showing a method of freeing water of iron by passing through it a strong current of compressed air. Other principal prize winners included IRVING G. MAYER, of Phoenix, Ariz., a chemist of the ARIZONA REFINING CO.; HAROLD W. MARTIN, of Belmont, Mass., an engineer for the ALLIS-CHALMERS MFG. CO. of Boston.

The INGALLS IRON WORKS CO., of Birmingham, Ala., have closed their Atlanta, Ga., office.

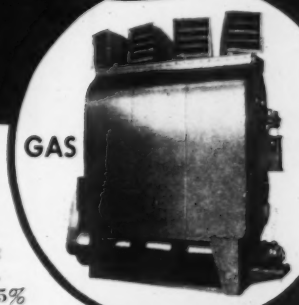
R. L. WELDON, president of the Bathurst Power & Paper Co. of Montreal, Canada, has been appointed newsprint administrator for the Wartime Prices and Trade Board.

The INDUSTRIAL EQUIPMENT CO., of 2313 First Ave. No., Billings, Mont., has been



DRAVO DIRECT FIRED HEATERS

. . . SAVE TRANSPORTATION & CRITICAL MATERIALS



● By actual comparison, made for the information of men responsible for allocating vital materials—heating systems of Dravo self-fired units use less metal* in the making and fewer man-hours in installing than heating plants of conventional design.

In operation, fuel requirements are 20 to 25% lower — a desirable cash economy in peace time, but important today as a means of conserving fuel and its transportation.

The Direct-Fired method of producing heat is not new—Dravo sold and installed such systems a decade ago. Today production and sales are soaring because of the demands of the War Program—but orders for quick delivery of standard sizes for essential plants can still be taken.

Architects, consultants, heating engineers, plant owners, purchasing agents,—anyone with an interest in the heating problem of a war plant—write or wire for description of the line of DRAVO HEATERS. Our engineering department will submit detailed recommendations, prices, weights, estimated fuel consumption, and delivery schedules for comparison with similar data on any other heating system you may have under consideration.

*WHY DRAVO HEATERS HAVE EARNED HIGHEST PRIORITY

● Just off the press, 12 page booklet showing the savings in critical materials made possible through the use of Dravo Heaters. Copy on request.

DRAVO CORPORATION
HEATER DEPARTMENT
DRAVO BUILDING PITTSBURGH, PA.
Sales Offices in Principal Cities

NEPTUNE METER COMPANY
THE WORLD'S LARGEST MAKERS OF LIQUID METERS
1892 . . . 1942
50 West 50th St., New York City
Branches in Principal American Cities and in Canada
Trident Meters

WILLIAMS Buckets
Welded Rolled Steel Construction

All types and capacities for all conditions. Send for Catalog.

The Wellman Engineering Co.
7000 Central Ave.
Cleveland, Ohio

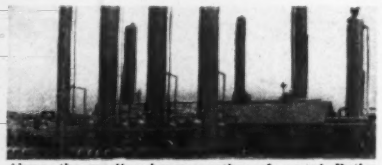
built by WELLMAN

With this 8200 H.P. recycling plant at Villa Platte, La., Continental Oil Company recovers gasoline from gas, then pumps the gas back into the oil sand to maintain gas pressure to produce more oil.

WORLD'S LARGEST OIL FIELD CONSERVATION PLANT HOUSED IN

BUTLER

READY-MADE STEEL BUILDINGS



Above, the gasoline house, another of several Butler Steel Buildings housing the world's largest recycling plant.

Many refineries are housed in Butler Steel Buildings—some of them insulated and air-conditioned. In the new phase of oil field stabilization large Butler Steel Buildings provide the speedy and economical solution to the housing of recycling equipment. They are just as adaptable for housing synthetic rubber plants if, as and when priority restrictions permit.

Pending that time it might stand you in good stead to figure with Butler Engineers on your synthetic rubber plant plans.

Augmented mass production facilities at Butler factories turn out Butler Steel Buildings rapidly. They are factory fabricated in section units engineered for speedy bolt-together erection. They are structurally strong, fire-safe, permanent—yet structures which are functional in design; i.e., readily fitted to particular housing purposes. Shown here are photographs of a few Butler Steel Buildings adapted to various housing purposes in the refining and recycling fields.

Above—Interior of lined and heated railway Fruit Handling Depot.

At right — Truck Garage at large Army Depot. Below—Insulated Machine Shop at River Rail Elevator.

Below—Restaurant—typical of Butler Buildings for Wayside and Drive-in enterprises.

Strikingly Beautiful Double Steel Wall Boulevard Buildings

BUTLER MANUFACTURING COMPANY

1267 Eastern Ave., Kansas City, Mo. • 962 Sixth Ave. S. E., Minneapolis, Minn.

SALES OFFICES IN PRINCIPAL CITIES

BUTLER

BAILEY METERS AND CONTROLLERS

FOR SEWAGE TREATMENT AND WATER SUPPLY . . .

● Venturi Tubes, Weirs, Flumes, Nozzles and other primary elements; Mechanically and Electrically operated Registers and Complete Automatic Control Systems.

BAILEY METER COMPANY

1029 IVANHOE ROAD • CLEVELAND, O.

Bailey Meter Co. Ltd., Montreal, Canada

"GUNITE"

can reduce your construction costs. It is efficient and dependable, an established product.

WE RECOMMEND "GUNITE" for structural steel protection, floor and roof slabs, thin exterior walls, partitions, tanks, reservoirs, restoring disintegrated concrete surfaces, repairing reinforced concrete, etc. Let us suggest how "Gunite" can best solve your problems.

PRESSURE CONCRETE CO.

"GUNITE" CONTRACTORS

6 Avenue B Newark, N. J.

appointed representative for sales and service of the J. D. ADAMS equipment.

EDWARD J. LEISER, superintendent of the Milwaukee works of the International Harvester Co. from 1929 to 1940, died at Milwaukee recently.

A. E. GIBSON (at left), president of the WELLMAN ENGINEERING CO., and G. W. BURRELL, chairman of the board, are shown during ceremonies recently at the company's Cleveland office on the occasion of the award of the joint Army-Navy "E" for speed and efficiency in construction of a series of giant drydock cranes to be used in construction of warships. In addition, "E" pins were presented by CAPT. L. N. MOELLER, of the Bureau of Yards and Docks, to representatives of company workers.

R. A. SCHOENFELD, vice president and sales manager for WHEELCO INSTRUMENTS CO., Chicago, has announced three appointments to the company's sales and service organization. C. L. CLARK, formerly of WESTINGHOUSE ELECTRIC & MFG. CO., has been appointed sales engineer at the Cleveland office; ROBERT N. MILLER, formerly of the MERCOID CORP., has been appointed service engineer with the Cleveland office; and HOWARD B. JONES, formerly of the McGRAW-HILL PUBLISHING CO., has been appointed sales and service engineer at the Chicago office.

EDWIN L. SMALLEY, 65, president of the HEVI-DUTY ELECTRIC CO. of Milwaukee, and formerly a trustee of the village of Whitefish Bay, Wis., died recently.

In a ceremony attended by representatives of the Army and Navy, local government officials, and company officials and employees, HANDY & HARMON recently were awarded the Army-Navy "E" award for achievement in producing war equipment.

The CUMMINS DIESEL ENGINE CORPORATION of New York recently changed its corporate name to the ROGERS DIESEL AND AIRCRAFT CORPORATION, of 1120 Leggett Avenue, New York City, N. Y. In its July 16 issue, *Engineering News-Record* erroneously stated the Rogers Company had become the Cummins Company.

3 REASONS *why engineers building...*

AIRPORTS ✓ HIGHWAYS ✓
SHIP YARDS ✓ NAVAL BASES ✓
CANTONMENTS ✓ TRAINING STATIONS ✓
DEFENSE PLANTS ✓ POWER PLANTS ✓

. . . are putting cable underground in ORANGEBURG *Conduits*

ORANGEBURG *Standard*

Orangeburg *Standard*, encased in concrete, is the most economical construction where duct-banks of four or more ducts are involved. For nearly half a century this conduit has been serving leading utilities, railroads, municipalities, and industrials, protecting power cables underground with this type of construction.

ORANGEBURG NOCRETE

Orangeburg NOCRETE is most economical for field services as it can be installed underground without concrete encasement. Its characteristics of mechanical strength combined with exceptional deflection make it ideal for services where ground stresses and settlement are encountered.

1 Orangeburg Conduits simplify *repairs* and *extensions* to service. If the cable fails, or loads are increased, the old cable can be pulled out and new cable pulled in through the Orangeburg Conduit, easily, economically, and without ripping up ground or expensive construction.

2 Orangeburg Conduits insure *continuity of service* by providing *lasting* and *complete* cable protection. Lasting because being essentially hard coal-tar pitch, Orangeburg is essentially everlasting . . . complete because corrosive underground water does not penetrate Orangeburg's walls or joints to reach and ruin the cable sheath.

3 And – Orangeburg Conduits offer economy – *plus*. Its cost is about half that of metal pipe (now critical material) and because it handles easily, assembles and installs faster than *any* conduit, its total savings are well worth investigation. *Write for Bulletin 422.*

ORANGEBURG *Conduits*

A lasting name underground for Forty-Nine Years

MADE AT ORANGEBURG, NEW YORK, BY THE FIBRE CONDUIT COMPANY, 292 MADISON AVE., NEW YORK CITY

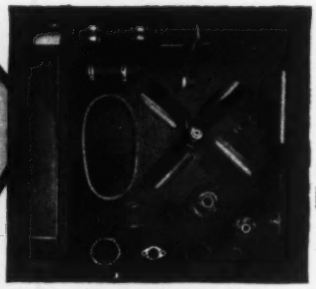
Sales Agent-Distributors

GRAYBAR ELECTRIC CO., INC. *(offices in principal cities)*

GENERAL ELECTRIC SUPPLY CORP. *(and associated houses)*

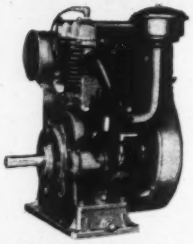
9-FC-3

CRITICAL MATERIALS, LABOR AND MACHINE WORK *Saved* FOR WAR PRODUCTION



In the promotion of today's urgent war effort, *manufacturers, sellers,* and *users* of power-operated equipment (within a 1 to 35 hp. range) can effect substantial savings of critical materials, labor, and machine work at the *manufacturing source* by specifying WISCONSIN AIR-COOLED ENGINE POWER.

These heavy-duty engines require none of the 26 parts illustrated above, which comprise the cooling system of a typical water-cooled engine . . . parts that also require periodical servicing and replacement. One simple flywheel-fan casting replaces all of these parts. And there are no water chores or troubles to worry about.



Wisconsin Heavy-Duty Air-Cooled Engines are made in a complete range of types and sizes, 1 and 4 cyl., 1 to 35 hp. Illustrated is the Model AHH Single Cyl. Engine.

WISCONSIN MOTOR Corporation

MILWAUKEE, WISCONSIN, U. S. A.

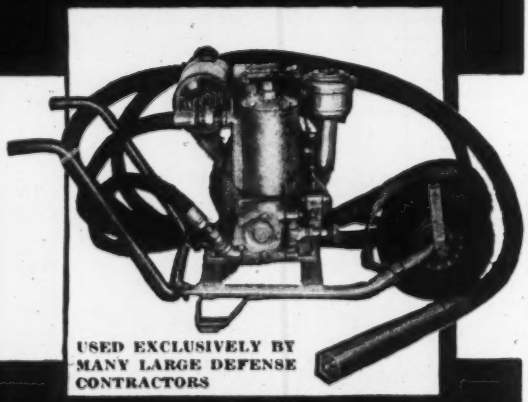
World's Largest Builders of Heavy-Duty Air-Cooled Engines

. . . *If you want to make speed profitably . . .* GET DEPENDABLE EQUIPMENT . . *Buy the Fast . . .*

JACKSON Hydraulic Concrete Vibrator

DESIGNED TO "TAKE IT" 3 SHIFTS A DAY EVERY DAY

- Automatic pressure lubrication—requires no attention.
- 34-ft. hose—2¾" vibrator head.
- Adjustable frequency to 6800 R.P.M.—submerged in concrete.
- Powerful gas engine—4.7 H.P.
- Long-lived, ball-bearing, rotary, hydraulic pump.



USED EXCLUSIVELY BY MANY LARGE DEFENSE CONTRACTORS

ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON, MICHIGAN

NEW PUBLICATIONS

Mounted Wheel Manual—A new manual published by the Chicago Wheel & Mfg. Co. features colored illustrations of the product reproduced with a few thousandths of an inch to exact scale. Shown are all types of mounted wheels and a wide variety of portable tool accessories. The booklet points out many time saving ideas on the use of portable tools and mounted wheels.—*Chicago Wheel & Mfg. Co.*, 1101 *W. Monroe St., Chicago, Ill.*

Inspection—The George Scherr Co. has brought out an eight page booklet entitled "Your Own Inspection Laboratory." Its aim is to assist war production plants, large and small, in the selection of equipment for the establishment of an inspection department. The booklet covers briefly the use of gage blocks, comparators, projectors and other inspection department essentials.—*George Scherr Co., 128 Lafayette St., New York, N. Y.*

For Victory—"Producing for Victory," a labor manual for increasing war production, has been published by the Federation of Architects, Engineers, Chemists and Technicians—a CIO affiliate. The booklet is presented as an immediate plan for increasing war production throughout the nation's industries, and is said to have received national approval as one of the outstanding pieces of literature on war production and labor management committees.—*The Federation of Architects, Engineers, Chemists and Technicians, CIO 5 Beekman St., New York, N. Y.*

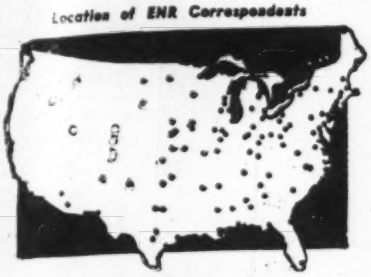
Maintenance—Maintenance hints for Clark "angle" super two-cycle gas engine driven compressors are contained in an 8-page bulletin issued by the Clark Bros. Co., Inc. The booklet contains a "trouble shooter's" chart listing many possible causes of failure in engines and their remedies, shows detailed isometric drawings of the company's own machines and their operation.—*Clark Bros. Co., Inc., Olean, N. Y.*

Instruments—A new 8½x11 in., 12-page publication, Roller-Smith Catalog 4120, has been issued describing the company's line of 3 in. and 4 in. panel instruments. In addition to a complete listing and prices, the various types of cases are illustrated, dimensions and listings of the complete line of shunts are given and RT current transformers for ratios up to 500/5 are illustrated and described. Dimensions and mounting details of all standard panel instruments are shown and a map indicates the location of the nearest Roller-Smith representative.—*Roller Smith Co., Bethlehem, Pa.*

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York
ELSIE EAVES, Manager *SCOTT McLEOD, Statistician*
(Daily service also available—Write for details)

Location of ENR Correspondents



Symbols and Abbreviations Include

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily
A-E-M Architect — Engineer-Management type of contract.

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply — Unclassified
Sewers, Waste Disposal — Latin America
Bridges, Grade Cross'gs — Public Buildings
Streets & Roads — Commercial Buildings
Earthwork, Waterways — Industrial Buildings

Stages Reported

PROPOSED: (except Streets & Roads):

BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Note: To comply with censorship requirements, addresses on some reports are being generalized. Data which would reveal the purpose of the improvements and the size are withheld. The name of contractor and general area are reported.

WATER SUPPLY

PROPOSED WORK

★†**Texas**—U. S. Eng., Fort Sam Houston, expanding WW and sanitary sewer facilities, outside overhead electrical sys. Over $45,000. Total est. $3,500,000 completed project.

★**Tex., Amarillo**—A. P. Hancock, city mgr., WW sys., Tex. 41-569. $634,496. Applied for FWA funds. Freese & Nichols, Capps Bldg., Fort Worth, engrs.

BIDS ASKED

Bids Asked September 28

Conn., Bristol—City, Bd. Water, Comns., 119 Riverside Ave., WW sys., constructing water intake, Cranberry Pond, near Reservoir 1. $15,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., engrs. CD 7/24—ENR 7/30.

Bids Asked September 29

Pa., Wilkes-Barre—Scranton-Spring Brook Water Service Co., 30 N. Franklin St., repairing, imprv. dam. Plans deposit $5. T. H. Wiggin, 90 Broad St., New York, N. Y., consult. engr. CD 8/25—ENR 8/27.

Bids Asked October 5

Calif., Pittsburg—City, F. R. Taormina, clk., exten. water sys. Plans deposit $10. CD 8/7—ENR 8/13.

Bids Asked October 14

†**N. C., Wilmington**—Mayor and City Council, City Hall, water supply, Kings Bluff Water Supply Proj., WPW Proj. N.C. $1-119. W. C. Olsen, 5 Exchange Pl., Raleigh, consult. engr.

Bids Asked

†**Texas**—U. S. Eng., Albuquerque, N. M., bids soon, water storage tank, Advance Notice No. 164; loading facilities, Advance Notice No. 166. Plans deposit $50 ea. project.

LOW BIDDERS

†**Texas**—U. S. Eng., Fort Sam Houston, Sept. 14, water lines, sanitary sewer lines, natural gas distr. lines, outside overhead electrical distr. sys., facilities, addl. bldgs., Spec. 42-344 in part, from J. A. Sharrock, Terrell, **$100,000-$500,000.**

†**Wash., Annapolis**—Federal Works Agency, Alaska Bldg., Seattle, Sept. 11, WW sys., from N. Moschetto, 5501 13 Ave. S., Seattle, **$51,932.** Est. $52,000. Parker & Hill, Smith Tower, Seattle, engrs.

CONTRACTS AWARDED

†**Arizona**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., drilling water well, Pima Co., to Roscoe Moss Co., 4360 Worth Ave., Los Angeles, Calif., under **$50,000.**

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, water and sewage sys., Orange Co., to C. W. Cooper, Orlando, and to C. T. Dawkins, 2425 Chicago Ave., Tampa, each under **$50,000.**

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, water supply, distr. sys., sewage collection and treatment sys., Pasco Co., to Ryan Constr. Co., Stovall office bldg., Tampa, under **$50,000.**

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, drilling well, Duval Co., to Virginia Machinery & Well Co., 731 Catherine St. S.W., Atlanta, Ga., under **$50,000.**

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, water distr. and sewage collection sys., to Ivy H. Smith, 1525 San Marco Blvd., Jacksonville, under **$100,000.** Awarded 9/8.

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, water distr. and sewage collection sys. expan., Bradford Co., to Langston Constr. Co., Orlando, under **$100,000.** Awarded 9/12.

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, water and sewerage sys., Lake Co., to Stansfield Constr. Co., Wauchula, under **$50,000.**

†**Indiana**—U. S. Eng., 612 Federal Bldg., Louisville, Ky., temporary timber water tower, erecting wooden water tank, Bartholomew Co., to Stuntz & Yeoman Co., Inc., Frankfort, under **$50,000.**

†**Iowa**—U. S. Eng., 1709 Jackson St., Omaha, Neb., furnishing, installing chlorinating equip., to H. A. Zimmer, Moline, Ill. Est. under **$50,000.**

†**Kansas**—U. S. Eng., Albuquerque, N. M., water, electric, sewerage sys., Ford Co., to P & E Constr. Co., Lamar, Colo., **$100,000-$500,000.**

†**Maryland**—U. S. Eng., Standard Oil Bldg., Baltimore, drilling wells, Harford Co., to Layne Atlantic Co., Cromwell Rd. & Flanders Ave., Norfolk, Va., under **$50,000.**

†**Maryland**—U. S. Eng., Standard Oil Bldg., Baltimore, filtration plant, Harford Co., to Sutter Constr. Co., New York, N. Y., **$100,000-$500,000.**

Mass., Hingham—Hingham Water Co., 20 South St., wells, to Layne-Bowler New England Corp., 19 Congress St., Boston, water sys., pump station and equip., Free St., to Chas. H. White, Jr., 233 Hersey St., Hingham. Est. **$15,000.** Bids 8/22. CD 8/17.

†**Missouri**—U. S. Eng., 601 Davidson Bldg., Kansas City, water supply lines, Buchanan Co., to Industrial Heating & Plumbing Co., 103 S. 4 St., St. Joseph, under **$50,000.**

†**Mo., Lebanon**—City, W. E. Kerr, mayor, WW imprvs., pumphouse, watermain exten., to Ralph McSweeny, Springfield. **$158,308.** Est. $150,000. **FWA.** CD 6/6—ENR 6/9.

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, water and sewer lines, Douglas Co., to National Constr. Co. and Central Plumbing Co., 1335 S. 20 St., Omaha. Est. under **$50,000.**

†**New Mexico** — U. S. Eng., Albuquerque, water supply wells, De Baca Co., to Samuel Butler & Oren F. Butler, Roswell, under **$50,000.**

†**New York**—U. S. Eng., 120 Wall St., New York, changes in well pumping and chlorinating equipment, Nassau Co., to E. K. Hutchinson & Son, 70 South St., Oyster Bay, under **$50,000.**

†**Ohio**—U. S. Eng., U. S. Post Office & Courthouse., Cincinnati, watermain, Marion Co., to Curro Constr. Co., South Euclid, under **$50,000.**

†**Ohio**—U. S. Eng., 700 Union Guardian Bldg., Detroit, Mich., water cooling tower, pump house, wells, accessory piping, Allen Co. to Green & Sadyer Co., 215 W. Market St., Lima, under **$50,000.**

O., Osborn—WW imprvs. and watermain exten., to R. E. Getz, Baltic. **$17,834.** Est. $20,000.

†**Pennsylvania** — U. S. Eng., Standard Oil Bldg., Baltimore, Md., installing water service connection, to Riverton Consolidated Water Co., Lemoyne. Est. under **$100,000.**

†**South Dakota**—U. S. Eng., 1709 Jackson St., Omaha, Neb., water well, Hughes Co., to Manning & Martin, Inc., Continental Oil Bldg., Denver, Colo., under **$50,000.**

†**Texas**—U. S. Eng., San Antonio water supply and observation towers, Guadalupe Co., to J. D. Scarborough, 243 E. Rosewood St., San Antonio, under **$50,000.**

†**Texas**—U. S. Eng., Fort Sam Houston, pump. facilities, for well, Spec. 42-333, Bexar Co., to San Antonio Machine & Supply Co., 325 N. Center St., San Antonio, under **$50,000.** Bids 9/10. CD 9/4.

†**Texas**—U. S. Eng., Fort Sam Houston, drilling, casing, developing 1 deep water supply well, Spec. 42-383, to Wiegand Bros. Drilling Co., Milam Bldg., San Antonio, under **$50,000.** Bids 9/14.

†**Texas**—U. S. Eng., San Antonio, water and sewerage sys., Bexar Co., to Truehart, Caldwell & Lee, Builders Bldg., San Antonio, under **$50,000.**

†**Washington**—U. S. Eng., 810 3 Ave., Seattle, WW sys., to Woodworth & Co. and L. B. MacDonald, 1200 East D St., Tacoma, under **$50,000.**

N. B., Moncton—Dpt. National Defense for Air, Ottawa, Ont., water and sewerage sys. and hangar roof drainage at Repair Depot, to Diamond Constr. Co., Moncton, **$18,000.** CD 2/18—ENR 3/5.

Ont., Kingston—Secy. Kingston Pub. Utilities Comm., 1,200 ft. 30 in. concrete, steel waterworks intake, pump. station substructure, to Russell Constr. Co., Ltd., 501 Harbour Comm. Bldg., Toronto, about **$61,500.** Bids 8/5. CD 7/22—ENR 7/30.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

★†**Conn., Bridgeport**—Dpt. P. Wks., Bridgeport, bids soon, sewers, sewage plant, Conn. 6107. $1,300,000.

BIDS ASKED

Bids Asked September 30

N. Y., Deer Park—Dpt. Mental Hygiene, State Office Bldg., Albany, sewers, gas and water lines, Edgewood State Hospital. $79,500.

Bids Asked October 1

†**Me., Bath**—Pub. Bldgs. Admin., North Interior Bldg., Wash., D. C., storm water drainage at housing project.

Bids Asked October 2

Calif., San Pablo — San Pablo Sanitary Dist., F. Carlfield, secy., Firehouse, sewer in Assessment Dist. 17. $51,915. No bids received Sept. 11. Plans deposit $15. P. Jones, Box 1299, Vallejo, engr.

Bids Asked October 7

Calif., Los Angeles—Bd. P. Wks., City Hall, sanitary sewers Hatteras St. and Camelia Ave. Sewer Dist. $31,643. L. Aldrich, City Hall, engr. CD 3/27—ENR 4/2.

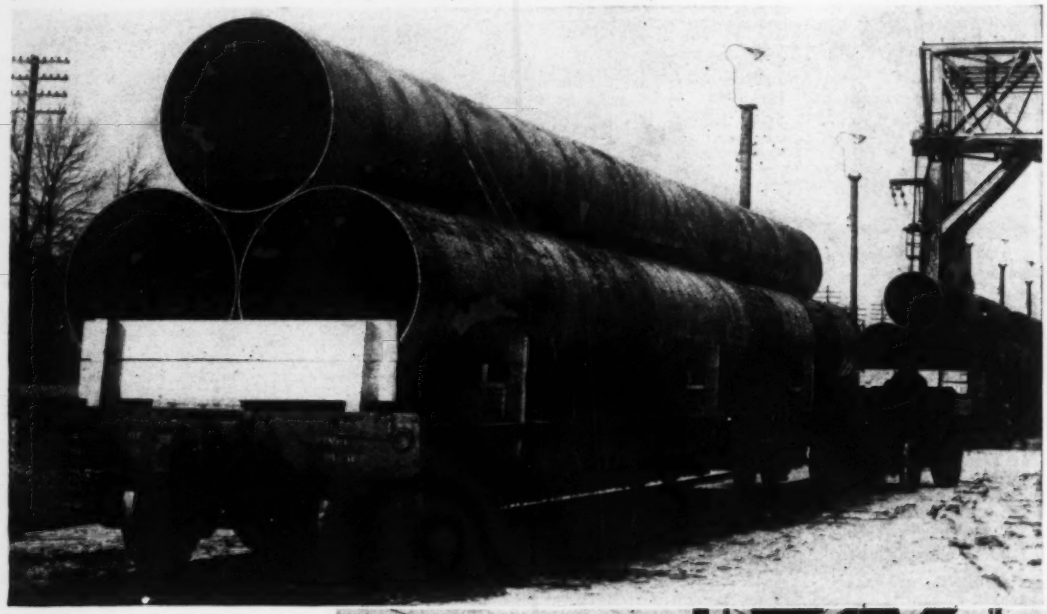
LOW BIDDERS

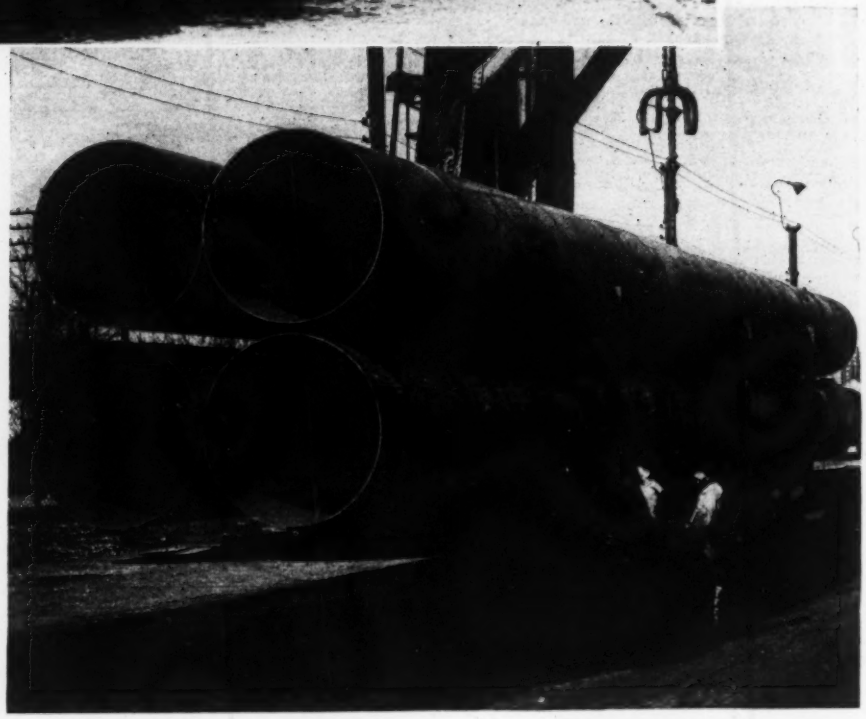
Calif., Los Angeles—Bd. P. Wks., City Hall, Sept. 16, sanitary sewer Riverside Dr. and Foreman Ave. Sewer Dist., from Artukovich Bros., 7320 N. Atlantic Ave., Hynes, **$180,174,** est. $76,347; in Mammoth Ave. and Davanna Terrace Sewer Dist., from Ivan Metkovich, 143 E. 81 St., Los Angeles, **$59,439.** CD 8/27—ENR 9/3.

†**Me., Bath**—Federal Works Agency, 2 Lafayette St., New York, N. Y., Sept. 16, sanitary sewer exten., Cont. 2, Me. 17-111, from H. Di Tullio & Co., 15 Laval St., Hyde Park, Mass., **$70,380.** Est. $62,500. CD 9/10.

†**Wash., Seattle**—Federal Works Agency, Alaska Bldg., Sept. 16, trunk sewer, 50 manholes, submarine outfall line and 1 comminuting plant, White Center Dist., south of here, Proj. Wash. 45-222, from Queen City Constr. Co., 603 18 Ave., S., **$213,648.** Est. $150,000. **FWA.** CD 9/9.

And those Caissons go rolling along





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CONTRACTS AWARDED

†**Arkansas**—U. S. Eng., Gay Bldg., Little Rock, sewage disposal plant, to Joseph J. Duffy Co., 726 W. Adams St., Chicago, Ill. Est. under $500,000. Awarded 8/29.

†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, sewer, water, electrical distr. sys., Ventura Co., to Perry J. Martinsen & Alton B. Carter, California Electric Co., Santa Barbara, $50,000-$100,000.

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, sewage disposal sys., Dade Co., to McGuire Plumbing Corp., 85 N.E. 62 St., Miami, under $100,000. Awarded 9/13.

Md., Towson—Comrs. Baltimore Co., Courthouse, 28,000 ft. 6- to 24-in. vitr. clay and concrete gravity sewer lines, Sparrow Point Section, to John L. Sullivan, 618 E. 34 St., Baltimore, $146,330. Bids 8/10. CD 7/30—ENR 8/6.

★†**Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, sanitary sewers, watermains, service connections, Chippewa Co., to McDermott & Sons, 402-3 Housemand Bldg., Grand Rapids, under $1,000,000.

†**Mo., Lebanon**—City, sewerage sys. addns., etc., Docket Mo. 23-154, to Ralph McSweeny, Springfield, $114,951. Est. $150,000. FWA. CD 5/29—ENR 6/4.

O., Alliance—Alternating sewage disposal plant, to Albinson Const. Co., Alliance $82,573. W. D. Sponseller, city engr. Bids 9/8.

†**O., Fort Clinton**—Pub. Bldgs. Admin., FWA., 610 S. Canal St., Chicago, Ill., trunk sanitary sewers, to F. Haddad, Cleveland Heights, $71,581.

†**Rhode Island**—U. S. Eng., 819 Industrial Trust Bldg., Providence, sewage disposal sys., Washington Co., to J. Williams, Dorchester, Mass., under $50,000.

†**Tennessee**—U. S. Eng., P. O. Box 97, Memphis, sewerage sys., to T. M. Strider & Co., Cotton States Bldg., Nashville.

†**Tennessee**—U. S. Eng., 306 U. S. Courthouse, Nashville, sewage treatment plant, Cumberland Co., to Rule & Murphy Co., Memorial Apt., Nashville, $50,000-$100,000.

†**Va., Norfolk**—Federal Works Agency, 606 State Planters Bank Bldg., Richmond, sewerage sys. addn., to A. G. Pinkston & Co., Old Kirn Bldg., Portsmouth, $60,416. FWA. CD 8/31—ENR 9/3.

†**Washington**—U. S. Eng., 800 3 Ave., Seattle, sanitary sewerage sys., Snohomish Co., to Washington Lumber Co., 3447 4 St., S.E., Seattle, under $50,000.

Que., Quebec City—Dpt. Natl. Defense, sewage pump. station, at Dominion Arsenal, to Magliore Cauchon Ltd., 325 de la Salle St., about $400,000.

Que., St. Hyacinthe—Dpt. National Defense, Ottawa, Ont., sewerage sys. at Signal School, to Corporation of City of St. Hyacinthe, St. Hyacinthe. $50,000.

BRIDGES GRADE CROSSINGS

BIDS ASKED

Bids Asked September 29

Connecticut—State. W. J. Cox, hy. comr., Hartford, navigation lines and 4,990 lin. ft. conduits Charter Oak Bridge, Hartford-East Hartford.

Bids Asked October 1

New York—Comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, cleaning, painting bridges H, L and U, in Croton Watershed, Westchester Co.

Bids Asked October 2

Kansas—State Hy. Dpt., Seneca, 13x11x15 ft. culvert exten. Project 1492, Jackson Co. R. C. Keeling, Topeka, engr.

Missouri—State Hy. Comn., Jefferson City, reconditioning bridge, Route 36, Sect. 31-A, Linn Co.; two 10 ft. rein.-con. slab span on Route SB, Sect. 2-B, Randolph Co., 12 ft. rein.-con. slab span culverts, on Route SD-DA-WR9-A (1) a. Johnson Co. C. W. Brown, Jefferson City, engr.

Texas—State Hy. Comn., Austin, concrete box culverts 7.097 mi. Hy. 183, SN FAP 634-F (1) Dallas Co. $40,000. T. E. Huffman, Dallas, engr.

LOW BIDDERS

California—State Div. Hys., Sacramento, Sept. 16, bridge, Mendocino Co., from Fred J. Maurer & Son, 3031 E St., Eureka, $346,110. CD 8/28—ENR 9/3.

O., Cleveland—Bd. Comrs. Cuyahoga Co., G. Stahler, clk., Sept. 4, bridge paving, from Allied Corp., Keith Bldg., $68,990. Est. $77,100. CD 8/20—ENR 8/27.

CONTRACTS AWARDED

Oklahoma—State Hy. Comn., Oklahoma City, concrete bridges, Rogers and Atoka Counties, to R. R. Tway, 710 E. 19 St., Oklahoma City, $35,595 and $26,023 respectively. Est. $37,011 and $22,061 respectively. Bids 9/15 awarded 9/17.

Quebec—Deputy Minister P. Wks., Quebec City, 375 ft. bridge over River Bostonnais, La Tuque, Laviolette, to O. Boisvert, 60 5 St., Shawinigan Falls. $35,000. Bids 8/25. CD 8/14—ENR 8/20.

STREETS AND ROADS

BIDS ASKED

Bids Asked September 29

Mich., Dearborn — D. M. Coburn, acting comr. P.W. & E. Contr. 1, 19,100 lin. ft. concrete curb and gutter; Contr. 2, 30,500 sq. yd. bituminous wearing surface. $40,000. Plans deposit $19. F. R. Storrer, city engr.

Mich., Wayne—Village, grading, draining, graveling 37,000 lin. ft. streets. $85,000. Plans deposit $15. P. E. Brender, village engr.

Ohio—State Hy. Dpt., Columbus, grading, widening, waterbound macadam and bituminous surfacing 4.978 mi. Sects D. Sherwood and F of SH 420, Defiance Co., $53,860; concrete resurfacing 3.735 mi. Sects. D-1, D-2 and D-3 of SH 291, Huron Co., $50,400; 3.969 mi. Sects. G, M, L-1 and P of SH 291, Medina Co., $49,700; 1.061 mi. Sect. Ashtabula, Bridge, Conneaut and R of SH 2, US 20, Ashtabula Co., $21,100; tar concrete resurfacing 1.956 mi. Sect. Struthers of SH 958 and SH 14, Mahoning Co., $25,480; adjusting drainage structure castings to new grade, concrete resurfacing Sects. A, Akron and Cuyahoga Falls of SH 16, Summit Co., $41,400; storm sewers 0.295 mi. Sect. Barberton of SH 17, US 21, Summit Co., $18,400.

West Virginia—State Road Comn., D. McClaugherty, secy., Charleston, concrete widening, tar concrete surface and drainage 0.385 mi. 3 Ave., Huntington, S.P. 3577, Cabell Co., certified check $1,400; grading, concrete paving 1.458 mi. Upton Creek-C and O Underpass Rd., Kanawha Co., certified check $9,500; 2.775 mi. Davis Creek-Unton Creek Rd., DANR 2-A(3), SNFA 222-D(2), SNFA 222-F(2) and SNFA 222-H(1), Kanawha Co., certified check $19,000; grading, draining, concrete on macadam paving, surface treating 1.821 mi. Maitland-Big Four Rd., FAP FA 309-B(2), McDowell Co., certified check $4,000.

Bids Asked October 1

Ill., Tuscola—Douglas Co., crushed stone surfacing 3.9615 mi. Sect. 22-MFT.

Ia., Fort Madison—Bd. Supervs. Lee Co., and P. A. Blackford, executor Alexander Coleman Estate, paving road from Iowa 16, near Sect. 18, T69N R-7W. $45,000. J. R. Dougherty, co. engr.

Pa., Pittsburgh—Comrs. Allegheny Co., City-County Bldg. resurfacing 1 mi. exten. Spring Run Rd., Moon Twp. Tentative date. $30,000. L. B. Duff, co. engr.

Bids Asked October 2

Kansas—State Hy. Dpt., Seneca, resurfacing material 1.5 mi. Proj. 1624, 4.27 mi. Proj. K1626, 2.628 mi. Proj. 1935, all foregoing Doniphan Co.; 2.141 mi. Proj. 1633, Jefferson Co.; 11.854 mi. Proj. 1625 AB, Leavenworth Co.; 11.348 mi. Proj. 1627, Marshall Co.; 6.291 mi. Proj. K1142, Nemaha Co.; 0.8 mi. Proj. 1628, 17.354 mi. Proj. 1629, 9.075 mi. Proj. 1630, all foregoing Pottawatomie Co.; 1.879 mi. Proj. 1631, Riley Co.; 5.16 mi. Proj. 1632, 7.783 mi. Proj. K1143, both Wabaunsee Co. R. C. Keeling, Topeka, engr.

Missouri—State Hy. Comn., Jefferson City, gravel surfacing 1.876 mi. Route SC-Sect. 8-B and 1.104 mi. Route SC-Sect. 4-B, both Warren Co.; 4.54 mi. Route SE-FAS 135-A (1) a, Harrison Co.; grading, crushed stone surfacing 0.078 mi. Route SB-Sect. 2-B, Randolph Co.; grading, rolled stone base 0.14 mi. Route SD-DA-WR 9-A(1), Johnson Co.; Alt. 1 aggregate 3,570 tons on 0.417 mi. Route SBB-DA-1-I, Alt. 2, concrete paving 0.417 mi. Route SBB-DA-W-I, Alt. 3, cement treated base Route SBB-DA-W-(1), all St. Louis Co. C. W. Brown, Jefferson City, engr.

New York—State Dpt. P. Wks., Div. Hys., A. W. Brandt, comr., Albany, constructing 4.74 mi. Albany Co., plans deposit $10; 0.68 mi. Onondaga Co., plans deposit $5; reconstructing 2.73 mi. Nassau Co., plans deposit $10; 9.71 mi. Nassau and Suffolk Counties, plans deposit $10; adv. ENR 9/24.

Bids Asked October 6

Washington — State Hy. Dpt., Olympia, clearing, draining, grading, paving 0.78 mi. Taylor Way, Pierce Co.; surfacing, stockpiling 7.75 mi. secondary road, Alfalfa to Satus, Yakima Co.; channel change and riprapping Bway. embankment slopes, State Rd. 3, vicinity New Hope, Columbia Co. Plans deposit $2. B. Bantz, Olympia, dir.

Bids Asked October 7

California — State Hy. Dpt., Sacramento, grading, Class B concrete paving 2.9 mi. and widening timber bridge between Salinas and Santa Rita, Monterey Co.; 2.5 mi. concrete widening and asphaltic concrete widening existing pavement between distribution structure and University Ave., in Oakland, Alameda Co. Over $50,000.

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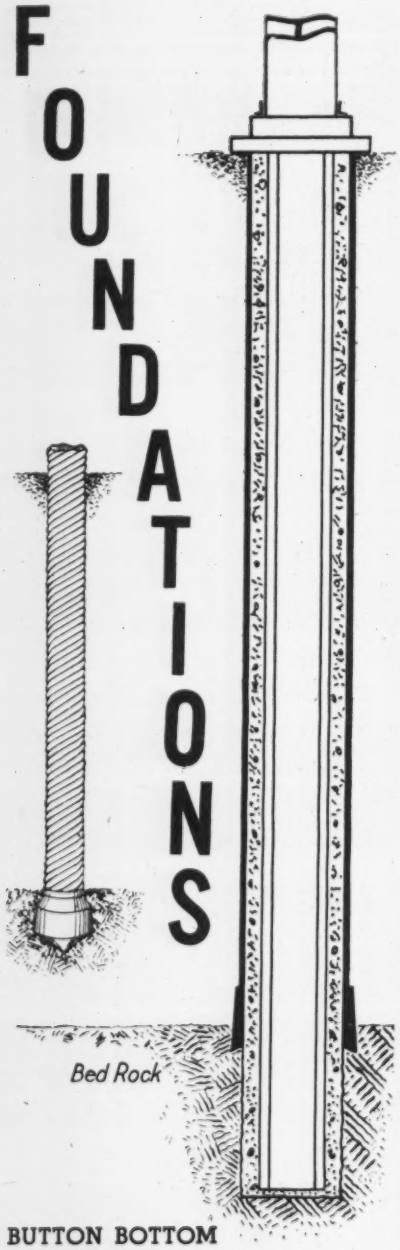

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ROADS, etc. (Bids Asked, Cont'd.)

Kansas—State Hy. Dpt., Winfield, light type surfacing 2.891 mi. Project K5075, Kingman Co., and 1.922 mi. Project K5076, Rice Co. R. C. Keeling, Topeka, engr.

Bids Asked October 9

Kentucky—Dpt. Hys., Frankfort, high type surfacing 1.629 mi. Ashbottom Rd. and Crittenden Dr., Jefferson Co.; grading, draining, high type surfacing 1.281 mi. Rice Springs Rd., McCracken Co.; high type widening 0.819 mi. Frankfort-Lexington Rd., Franklin Co.; roadside imprv. 7.776 mi. Shelbyville-Frankfort Rd., Franklin and Shelby Counties; 11.675 mi. Shelbyville-Frankfort Rd., Shelby Co.; bituminous surfacing 0.415 mi. Trevillian Way, Jefferson Co.

Bids Asked

†**New Mexico**—U. S. Eng., Albuquerque, grading, draining, embankment, surfacing. $65,000. Plans deposoit $25.

LOW BIDDERS

★**California**—State Div. Hys., Sacramento, Sept. 16, imprv. 0.6 mi. Marin Co., from A. G. Raisch, 2048 Market St., San Francisco, **$93,009*****1.9 mi. Monterey Co., from Granite Constr. Co., Box 900, Watsonville, **$258,985*****4.9 mi. Kern Co., from Union Paving Co., 212 Babcock Bldg., San Francisco, **$336,340.** CD 8/28—ENR 9/3.

Connecticut—State, W. J. Cox, hy. comr., Hartford, Sept. 18, 6450 ft. rein.-con. paving Sect. U. S. Route 5, Wethersfield-Newington, from D. V. Frione & Co., Inc., 87 Foxon Rd., New Haven, **$77,461.** CD 9/14.

Idaho—Dpt. P. Wks., Bureau Hys., Boise, Sept. 15, grading, draining, crushed gravel surfacing 3.097 mi. Parker-Egin Rd., Miscellaneous Proj. 529-C(1), Fremont Co., from Nick Burggraf, Inc., Idaho Falls, **$55,393.**

★**Indiana**—State Hy. Comn., Indianapolis, Sept. 15, imprv. 8.419 mi. Johnson Co., from Calumet Paving Co., 309 W. Washington St., Indianapolis, **$509,167,** est. $517,493 *** 1.164 mi. Road Contr. 2332, from Berns Constr. Co., 129 E. Market St., Indianapolis, **$105,879,** est. $106,463 *** 1.201 mi. Vanderburgh Co., from Pioneer Contg. Co., Upper Mt. Vernon Road, Evansville, **$72,993,** est. $82,897***1.361 mi. Marion Co., from W. D. Vogel, 3760 E. St. Clair St., Indianapolis, **$105,832,** est. $111,257***0.496 mi. Marion Co., from Union Asphalt Constr. Co., 327 Lemcke Bldg., Indianapolis, **$39,325,** est. $42,625*** 0.898 mi. St. Joseph Co., from Bontrager Constr. Co., 618 W. Indiana St., Elkhart, **$48,731,** est. $53,576***4 mi. Laporte Co., from Brooks Constr. Co., 1123 Barthold St., Fort Wayne, **$30,185,** est. $39,417. Rejected bids Sept. 15, imprv. 0.225 mi. Bartholomew Co., 3.2 mi. Vermillion Co., 1.011 mi. Madison Co., 5.528 mi. Allen Co., 1.933 mi. Lake Co., will readvertise. CD 8/31—ENR 9/3.

Kentucky—Dpt. Hys., Frankfort, Sept. 18, imprv. 1.591 mi. Jefferson Co., from White Consolidated, Inc., 1735 Fullerton St., Chicago, Ill., **$150,546.** CD 9/9.

★**Kentucky**—Dpt. Hys., Frankfort, Sept. 16, imprv. 3.81 mi. Boone Co., from H. K. Williams, 1326 S. 7 St., Louisville, **$81,616***** 2.31 mi. Boyd Co., from Middle States Bituminous Corp., Ironton, Ohio, **$64,760*****1.772 mi. Madison and Fayette Counties, and 3.144 mi. Whitley Co., from Codell Constr. Co., Winchester, Ky., **$257,101** and **$343,583** respectively. CD 8/28—ENR 9/3.

Maryland—State Roads Comn., Baltimore, Sept. 15, Contr. P-315-4-511, imprv. 0.377 mi. hy., Prince George Co., from E. R. P. Smith, Hyattsville, Item 12 **$19,904,** Item 12a **$50,256.** CD 9/9—ENR 8/27.

Michigan—State Hy. Dpt., Lansing, Sept. 9, imprv. 2.45 mi. Macomb Co., from Frank J. Knight Co., 3681 Dunn Rd., Detroit, **$155,259.** CD 9/2; imprv. 0.347 mi. Allegan Co., from Carl Goodwin, 512 Ely St., Allegan, **$48,165***** 0.494 mi. Wexford Co., and 0.63 mi. Benzie Co., from E. J. VanderVeen, 3110 Plainfield Ave., Grand Rapids, **$34,950** and **$45,884** respectively***1.324 mi. Wayne Co., from Oak Constr. Co., 520 E. Lincoln Ave., Royal Oak, **$122,440.** CD 9/3.

Nevada—State Hy. Dpt., Carson City, Sept. 11, grading, surfacing area 500 ft. wide, 8,000 ft. long, near State Route 11, Elko Co., from Hunt & Frandsen, Reno. **$306,025.**

†**South Carolina**—U. S. Eng., Sumter, Sept. 14, grading, drainage, from Boyle Constr. Co., Sumter.

†**Virginia**—Pub. Roads Admin., 515 14 St. N.W., Wash., D. C., Sept. 15, DA-WR-8, Paving 27, War Dpt. Bldg. Rd. Network, from Troitino Constr. Co., Alexandria. **$119,319.**

Washington — State Hy. Dpt., Olympia, Sept. 15, imprv. 2.7 mi. Pacific Hy., Clark Co., from P. W. Yett, 3525 N.E. 17 St., Portland, Ore., **$183,428.** CD 9/2.

CONTRACTS AWARDED

†**Arizona**—U. S. Eng., Albuquerque, N. M., roads and drainage, Coconino Co., to Arizona Constructors, Homebuilders Bldg., Phoenix, under **$50,000.**

†**California**—U. S. Eng., 74 [illegible] ery St., San Francisco, hards[illegible] storage area, to Lowrie Pav[illegible] 1540-16 St., San Francisco, Southern Pacific Co., 65 [illegible] Francisco. Awarded 9/15.

†**California**—U. S. Eng., 751 [illegible] Los Angeles, roads, driveways, Riverside Co., to Calowell Co[illegible] Beach, **$100,000-$500,000.**

†**California**—U. S. Eng., 751 S[illegible] Los Angeles, service roads, Sa[illegible] Co., to Thereon N. Bohannan, V[illegible] der **$50,000.**

Calif., Vallejo—H. W. Mitche[illegible] imprv. Waterfront Rd., to A[illegible] 2048 Market St., San Francisco, $[illegible] 9/15.

†**Colorado**—U. S. Eng., c/o Post[illegible] ver, road surfacing, erecting br[illegible] Co., to Hubner, 2354 Kearney [illegible] under **$50,000.**

†**Florida**—U. S. Eng., Courth[illegible] & Post-office, Jacksonville, paving for h[illegible] Hillsborough Co., to Ford Plumb[illegible] Co., 3807 Florida Ave., Tampa, **$100,000-$500,000.**

†**Florida**—U. S. Eng., Courthou[illegible] & Post-office, Jacksonville, paving roads [illegible] to J. D. Manly, Leesburg, under $50,000.

†**Florida**—U. S. Eng., Courthou[illegible] & Post-office, Jacksonville, clearing, grubbing, grading, drainage, paving, Lake Co., to J. L. Cone & J. D. Manly, Caesar Ave. and Cumberland Rd., Tampa, **$100,000-$500,000.**

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, concrete paving, temporary frame bldgs., Monroe Co., to Brinson Constr. Co., Tampa, **$100,000-$500,000.**

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, grading, paving, drainage roads, and parking area, Bay Co., to Coggin & Deermont, Chipley, under **$200,000*****[illegible] Bay Co., to J. O. Carlile, Tallahassee, under **$100,000.** Awarded 9/12.

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, paving, Dixie Co., to Ebersbach Constr. Co., Stovall Office Bldg., Tampa, **$50,000-$100,000.**

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, grading, paving roads, Dade Co., to W. T. Price Dredging Co., 3260 S.W. 27 St., Miami, under **$100,000*****water supply and distr. sys., Dade Co., to McGuire Plumbing Corp., 85 N.E. 62 St., Miami, under **$100,000*****plumbing facilities, Dade Co., to Winters Constr. Co., Miami, under **$100,000.** Awarded 9/12.

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, roads, streets, Lee Co., to J. L. Cone & J. D. Manly, Caesar Ave. and Cumberland Rd., Tampa, under **$100,000.** Awarded 9/13.

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, roads, Marion Co., to L. J. Cobb Constr. Co., Dunellon, under **$100,000.** Awarded 9/13.

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, grading, paving, Pasco Co., to J. E. Ballenger Constr. Co., Lakeland, under **$100,000.** Awarded 9/13.

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, roads, Santa Rosa Co., to Noonan Constr. Co., 1001 E. Gregory St., Pensacola, under **$100,000.**

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, paving, parking areas, Starke Co., to M. B. McCormick & Son, Inc., Ocala, and James H. Craggs, Ocala, under **$100,000.** Awarded 9/12.

†**Georgia**—U. S. Eng., Courthouse & Post-office, Jacksonville, Fla., paving, Lowndes Co., to J. B. Gibson Constr. Co., Donalsonville, **$100,000-$500,000.**

†**Georgia**—U. S. Eng., Courthouse and Post-office, Jacksonville, Fla., grading, surfacing, to Coffee Constr. Co., Eastman, under **$100,000.** Awarded 9/8.

†**Georgia**—U. S. Eng., Courthouse and Post-office, Jacksonville, Fla., paving roads, to Scott Constr. Co., Thomasville, under **$100,000.** Awarded 9/8.

Idaho—State, Dpt. P. Wks., Boise, Imprv. 12.47 mi. Moscow-Bovill Hy., Latah Co., to Carbon Bros., N. 3430 Cook St., Spokane, Wash., **$96,280*****10.83 mi. Nesperce Hy., Lewis Co., to Lobnitz Bros., Sonna Bldg., Boise, **$68,965*****16.22 mi. Gooding-Fairfield Hy., Gooding and Camas Counties, to Hoops Constr. Co., Twin Falls, **$91,581*****Miscellaneous Project 1136, Bonner Co., to D. A. Sullivan, Parkwater, Wash., **$75,990.** Grand total $332,-816. Bids 9/11.

Ill., Pana—Paving S. Poplar and E. 2 Sts., to Earl Walker, Sullivan, **$30,775.**

†**Indiana**—U. S. Eng., 612 Federal Bldg., Louisville, Ky., clearing, grading, grubbing, paving, Jackson Co., to Carl Myers & Co., Campbellsburg, **$100,000-$500,000.**

†**Indiana**—U. S. Eng., 612 Federal Bldg., Louisville, Ky., clearing, grading, grubbing, paving, Jackson Co., to Bardstown Transfer Line, Springfield, Ky., **$100,000-$500,000.**

†**Iowa**—U. S. Eng., Clock Tower Bldg., Rock Island, Ill., paving, Polk Co., to Central Engineering Co., 2531 Rockingham St., Davenport.

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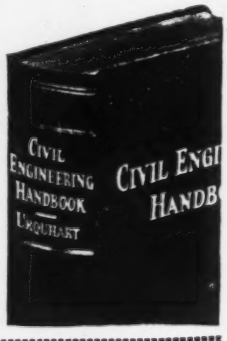

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ROADS (Contracts Awarded, (Cont'd)

†Iowa—U. S. Eng., Clock Tower Bldg., Rock Island, Ill., clearing, grading, Polk Co., to Burch Constr. Co., 249 33 Dr. S.E., Cedar Rapids, and McCarthy Imprvt. Co., 601 Bahl Bldg., Davenport.

Ia., Onawa—Monona Co., grading 4½ mi. road, to Clark Constr. Co., Merrill, **$28,078.** R. A. Rawlings, co. engr.

†Kansas—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., roads, parking areas, drainage structures, water distr. and sanitary sewers, Ellis Co., to Stephens-Brown Co., BMA Bldg., Kansas City, Mo., **$100,000-$500,000.**

★**†Kansas**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., grading, drainage structures, Dickinson Co., to Geo. Bennett Constr. KCK Food Term., Kansas City, Kan., **$500,000-$1,000,000;** paving, Dickinson Co., to L. V. Hotes, Kansas City, Mo., and Grant A. Stannard, 434 N. Rock Island St., Wichita, **$1,000,000-$5,000,000.**

†Louisiana—U. S. Eng., Postoffice & Courthouse, Vicksburg, Miss., roads, streets, Ouachita Parish, to A. C. Campbell Co., 86 Crockett St., Shreveport. Est. **$50,000-$100,000.**

★**†Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, excavating, grading, paving, drainage, electrical work, Macomb Co., to M. J. Boyle, 1744 N. Mozart St., Chicago, Ill., **$1,000,000-$5,000,000.**

★**†Nebraska**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., grading pavement, Fillmore Co., to Bushman Constr. Co., 1801 S. 8 St., St. Joseph, Mo., **$1,000,000-$5,000,000.**

★**†Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, clearing, grading, grubbing, paving, Hall Co., to Ed. H. Honnen Constr., Co., Colorado Springs, Colo., **$1,000,000-$5,000,000.**

†Nevada—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., access roads, parking areas, to Gibbons & Reed Co., 259 W. 3 South St., Salt Lake City, Utah. Est. under **$50,000.** Awarded 9/11.

★**New Jersey**—S. Miller, Jr., Comr. State Hy. Dpt., Trenton, imprv. road, Burlington Co., to J. P. Burns, Dumont, **$901,732.** Awarded 9/9. CD 9/4—ENR 9/10, under LB.

N. J., Elizabeth—Union Co., Courthouse, excavating, removal trolley tracks, repaving surfaces various roads. **WPA. $74,610.** J. H. Weitzen, Chestnut St. and Hamilton Ave., Trenton, WPA engr.

N. J., Hackensack—Bergen Co., Administration Bldg., excavating, removal trolley tracks, repaving surfaces, various roads. **WPA. $67,-210.** Carl Malstrom, Orange and N. 6 Sts., Newark, WPA engr.

N. J., Secaucus—Grading, replacing 6 in. concrete granite block, sheet asphalt and 8 in. rein.-con. pavements, **WPA, $105,699.** C. Malstrom, Orange and N. 6 Sts., Newark, WPA engr.

†New Mexico—U. S. Eng., Albuquerque, temporary frame bldgs., Luna Co., to K. L. House Constr. Co., Albuquerque, **$100,000-$500,000.**

★**†New York**—U. S. Eng., 120 Wall St., New York, pavement, Suffolk Co., to Sicilian Asphalt Paving Co., 41 Park Row, New York, **$500,000-$1,000,000.**

O., Cleveland—F. Foy, city purch. agt., paving Quincy Ave., to Cuyahoga Asphalt & Paving Co., 9501 Woodland Ave., **$65,101.** Bids 9/10. J. C. Wenrick, City Hall, engr.

O., Cleveland—Cuyahoga Co., paving Turney Rd., to Garland Bros. Co., 5805 Franklin Blvd., **$71,275.** Est $71,400. Bids 9/15. CD 9/10.

Oklahoma—State Hy. Comn., Oklahoma City, imprv. 1.3 mi. Jackson Co., to Brooks & Dahlgren, Insurance Bldg., Oklahoma City, **$93,629,** est. $81,791***1.9 mi. Tulsa Co., to Standard Paving Co., 2119 E. 11 St., Tulsa, **$292,094,** est. $273,123; 2.6 mi. Claremore Co., to Rickards & Mullinix Co., 1401 W. 5 St., Oklahoma City, **$59,149,** est. $53,310. Bids 9/15, awarded 9/17. Received no bids Sept. 15, imprv. roads Atoka, Cleveland and Tillman Counties.

†Oklahoma—U. S. Eng., 416 Wright Bldg., Tulsa, paving, surfacing, Oklahoma Co., to Luke-Dick Co., Oklahoma City, **$100,000-$500,000.**

Pa., Pittsburgh—City, F. M. Roessing, dir. Wks. Dpt., City County Bldg., imprv. Saw Mill Run Blvd., to John J. Ryan Constr. Co., 4032 Beechwood Blvd. Bids 8/24. CD 8/19.

†South Dakota—U. S. Eng., 1709 Jackson St., Omaha, Neb., bituminous road surfacing, to B. S. Andrus, Richmond and S. Concord Sts. S., St. Paul, Minn. Est. under **$50,000.**

†Texas—U. S. Eng., 25 St. and Avenue F, Galveston, paving, Tom Green Co., to R. Albert, San Angelo, under **$50,000.**

†Texas—U. S. Eng., San Antonio, roads, Bastrop Co., to G. Mora, 312 Sabine St., Houston, **$100,000-$500,000.**

★**†Washington**—U. S. Eng., 800 3 Ave., Seattle, paving, to A. Osberg, 502 N. 62 St., Seattle, **$500,000-$1,000,000.**

EARTHWORK, WATERWAYS

BIDS ASKED

Bids Asked September

O., Van Wert — Van Wert Co. Comrs., Van Wert, widening, 2.01 mi. channel of Little Au[illegible] **$19,701.** T. K. Priddy, Van W[illegible] engr.

Bids Asked September 30

†New Mexico—Bureau Reclamation, Custom-house, Denver, Colo., 4 welded [illegible] outlet pipes, appurtenances, del. E[illegible] N. M., for Elephant Butte Dam, Rio Grande Project, new Mexico-Texas. Spec. 1666-D.

Bids Asked October 1

†California—Bureau Reclamation, Custom-house, Denver, Colo., fabricated pipe fittings, appurtenances for control of 102 conduit tube valves at elevation 842 and 9[illegible] in river outlets at Shasta Dam, Kennett Div., Central Valley Project, Spec. 1667-D.

†Maine — Pub. Housing Auth., PHA, 24 School St., Boston, Mass., drainage sys., for housing.

Bids Asked October 6

Miss., Biloxi — Bd. Supervs. Harrison Co., Gulfport, small craft harbor. $75,000. Collins & Dacey, Biloxi, archt.

Bids Asked October 12

†California—Bureau Reclamation, Custom-house, Denver, Colo., regulating gates for spillway, Keswick Dam, Kennett Div., Central Valley Project, Spec. 1045. Extended date. CD 8/26—ENR 9/3.

Bids Asked October 13

Wash., Tacoma—City, City Hall, 13.8 kv bus and equip. for La Grande powerhouse, part of second Nisqually power development.

Bids Asked October 19

†Tex., Robstown—At office Nueces Co. Judge, draining facilities, Tex. 41-357, for Nueces Co. Drainage Dist. 2, A. M. Stone, chn. bd. dir., Robstown, $483,595. **FWA.** Garrett Eng. Co., 3504 Audubon St., Houston, engrs. CD 7/21—ENR 7/23.

LOW BIDDERS

†Calif., Burbank—Federal Works Agency, 1206 Santee St., Los Angeles, Sept. 15, lower section Lockheed Channel, Inv. 6 RE-124, Cont. 1, Docket Calif. 4-458, from Geo. J. Bock Co. & Byerts & Dunn, 1131 N. Orange Grove Ave., Los Angeles, **$159,817.** CD 9/9.

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, Sept. 10, dredging 975,000 cu. yd. material, Inv. 43-80, from Atlantic Gulf & Pacific Co., Scanlan Bldg., Houston, Tex. CD 9/4.

CONTRACTS AWARDED

†California—U. S. Eng., Wright Bldg., Sacramento, reconstructing Feather River levee from junction of 803 levee and east levee of Sutter by-pass to Nicolaus bridge, to H. Earl Parker, 1112 G St., Marysville. Est. **$50,000-$100,000.** Awarded 9/10. Additional to CD 7/10—ENR 7/16.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, drainage, imprv. levees, Marin Co., to Nicholson, Moore & Campbell, Oakland, **$50,000-$100,000.**

Calif., South San Francisco — Excavating channels Colma Creek from Linden to Orange Aves., removing 190,000 cu. yd. earthwork, to L. C. Smith, 1 and Railroad Sts., San Mateo, **$19,200.** Bids 9/14. R. A. Klassen, 2382 Bway., Redwood City, engr.

†Florida—U. S. Eng., Courthouse & Postoffice, Jacksonville, dredging, Monroe Co., to Shell Producers Co., Rattlesnake, **$50,000-$100,000.**

†Georgia—U. S. Eng., Postoffice Bldg., Savannah, storm drainage sys., Richmond Co., to Patterson & Son Trucking Co., Augusta, under **$50,000.**

†Kansas—U. S. Eng., Wright Bldg., Tulsa, Okla., levee, Neosho Co., to E. V. James Constr. Co., Tulsa, Okla., under **$50,000.**

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, dredging, Jefferson and St. Charles Parishes, to Shell Producers Co., 115 S. Water St., Tampa, under **$100,000.** Awarded 9/13.

†Maine—U. S. Eng., Park Square Bldg., Boston, Mass., earthwork, to T. W. Cunningham, Inc., 61 State St., Bangor. Est. over **$25,000.** CD 9/15-ENR 9/17.

New Jersey—State, Bd. Commerce & Navigation, 1060 Broad St., Newark, timber bulkhead, Project 180, at Long Branch, and repairs to north jetty, Project 182, at Allenhurst, to Thomas Proctor, Inc., 218 N. 5 St., Long Branch, **$184,606** and **$40,400** respectively. Bids 9/9. Received no bids Sept. 9, stone jetty on Atlantic Ocean, Project 181, at Stone Harbor, will readvertise. CD 8/31—ENR 9/3.

†Texas—U. S. Eng., 25 St. and Avenue F, Galveston, excavation work, to F. B. Blank, 6301 Telephone Rd., Houston, under **$50,000.**

EARTHWORK, Contracts Awarded, (Cont'd.)

†**Washington**—U. S. Eng., 810 3 Ave., Seattle, clearing, burning Area 1, Mud Mountain dam reservoir, to Stergion Concrete Products Co., Enumclaw, under $50,000; clearing, burning Area 2, Mud Mountain dam reservoir, to S. R. Gray, 423 N. Meridian St., Puyallup, under $50,000.

UNCLASSIFIED

PROPOSED WORK

California—IMPROVEMENTS—H. J. Kaiser Co., Latham Square Bldg., Oakland, imprvs. bldg.

†**California** — IMPROVEMENTS — National Advisory Com. for Aeronautics, Moffett Field, imprvs.

†**Florida** — IMPROVEMENTS — U. S. Eng., Courthouse & Postoffice, Jacksonville, engineer-architect services by Bail, Horton & Associates, 409 W. Adams St., Jacksonville, imprvs., electric, water, sewerage sys., Dixie Co.

Fla., Jacksonville—AIRPORT—National Air Lines, 241 Forsyth St., bids soon new operating and mainetnance facilities at municipal airport. $60,000-$100,000.

†**Georgia** — IMPROVEMENTS — U. S. Eng., Postoffice Bldg., Savannah, imprvs., storm drainage sys., light grading, Inv. 819-43-1.

†**Georgia** — IMPROVEMENTS — U. S. Eng., Postoffice Bldg., Savannah, imprvs.

★†**Indiana**—IMPROVEMENTS—U. S. Eng., 612 Federal Bldg., Louisville, Ky., plans by McGuire & Shook, 1401 Fletcher Trust Bldg., Indianapolis, and D. A. Bohlen & Son, 1001 Majestic Bldg., Indianapolis, imprvs., bldgs. Over $1,000,000.

★†**Iowa** — IMPROVEMENTS — U. S. Eng., Clock Tower Bldg., Rock Island, Ill., imprvs. Over $500,000.

★†**Iowa** — IMPROVEMENTS — U. S. Eng., Clock Tower Bldg., Rock Island, Ill., imprvs. Over $500,000.

★†**Iowa** — IMPROVEMENTS — U. S. Eng., Clock Tower Bldg., Rock Island, Ill., imprvs. $900,000.

Louisiana—PIPELINE—Texas Co., 919 St. Charles St., New Orleans, 2 in. oil pipe line, Terrebonne Parish.

Louisiana—EXPLORATORY WELLS—The Texas Co., 919 St. Charles St., New Orleans, exploratory well drilling structures, dredging slip, channels, in Lake Pelto and Wine Island Pass, Terrebonne Parish.

★†**La., Pollock** — AIR FORCE INSTALLATION—U. S. Eng., Postoffice & Courthouse, Vicksburg, Miss., air force installation. Over $2,000,000.

La., Shreveport—GAS PIPE LINE CARRIER—United Gas Pipe Line Co., 1515 Fairfield Ave., 5½ mi. 8 in. natural gas pipe line carrier. $70,000.

Michigan — IMPROVEMENTS — Holthe & Schultz, Muskegon, imprvs. $200,000.

★†**Missouri**—IMPROVEMENTS—U. S. Eng., P. O. Box 97, Memphis, Tenn., imprvs., grading, paving. $500,000-$1,000,000.

Mo., Springfield—AIRPORT—H. B. Carr, mayor, $350,000 bond election Oct. 1, airport. CD 9/9—ENR 9/17.

†**New Jersey**—GRADING, LANDSCAPING—U. S. Eng., 120 Wall St., New York, N. Y., grading, landscaping, sewers, roads, etc. $71,000. WPA. J. H. Weltzen, Chestnut and Hamilton Aves., Trenton, engr.

N. Y., Long Island City—PLANTING, etc.—Comr. Parks, at office Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York, received no bids Sept. 11, planting and topsoiling incidental to paving South Service Rd. of Grand Central Parkway from 86 St. to Ditmars Blvd., etc. CD 9/2.

N. Y., New York—GASOLINE STATION—Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., gasoline station, Fort Washington Park, Henry Hudson Parkway, opposite W. 172 St. $35,000. Madigan-Hyland, 28-04 41 Ave., Long Island City, engrs.

O., Youngstown—SWIMMING POOL—City Park & Recreation Comn., purchased site known as Wright Field for swimming pool. Over $50,000. CD 7/29—ENR 7/31.

Pa., Chester — FIRST AID BUILDING — Sun Ship Building Co., Chester, first aid bldg. $40,000.

★†**South Carolina**—AIR FORCE INSTALLATION — U. S. Eng., 33 Customhouse, Charleston, air force installation, North Charleston. Over $3,000,000.

†**South Carolina**—IMPROVEMENTS—U. S. Eng., 33 Customhouse, Charleston, imprvs.

★†**Texas** — IMPROVEMENTS — U. S. Eng., 25 St. and Avenue F, Galveston, rejected bids, imprvs. Will award later. CD 9/11—ENR 9/17, under LB.

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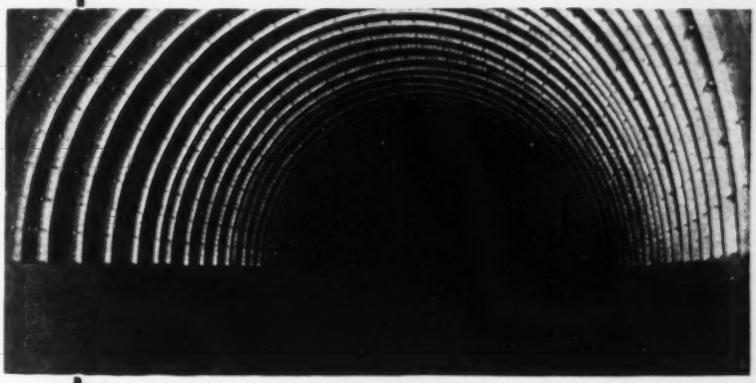

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UNCLASSIFIED (Proposed Work, Cont'd.)

Tex., Texas City — TANKS — Pan-American Refining Corp., Texas City, several 80,000 bbl. steel ground tanks for gasoline and naphtha storage purposes.

†Wash., Deer Park—AIRPORT RUNWAYS—Civil Aeronautics Admin., Boeing Field, Seattle, 2,100 ft. exten. to 2 runways, addnl. 7,100 ft. runway, taxi space, etc. CD 2/3—ENR 2/5.

Wis., Marinette—AIRPORT—J. Moore, city clk., airport.

Wis., Wausau — AIRPORT — J. L. Brown, city clk., expanding airport.

Wyo., Laramie — HANGAR — University of Wyoming, C. B. Jensen, supt. bldgs., Laramie, preparing plans 80x160 ft., brick, tile hangar at General Brees Field. $30,000.

†Pacific Northwest—FIRE ALARM SYSTEM—U. S. Eng., 810 3 Ave., Seattle, Wash., automatic fire alarm sys.

†Pacific Northwest—LIGHTING SYSTEM—U. S. Eng., 810 3 Ave., Seattle, Wash., night lighting sys.

†Pacific Northwest — STEAM DISTRIBUTION SYSTEM, etc.—U. S. Eng., 810 3 Ave., Seattle, Wash., steam distr. sys., Inv. 135; painting; installing lighting sys.; training sys.

BIDS ASKED

Bids Asked September 29

†New York—LIGHTING SYSTEM—U. S. Eng., 960 Ellicott Square Bldg., Buffalo, night lighting sys. CD 9/17.

Bids Asked

†New Mexico—CONSTRUCTION, etc.—U. S. Eng., Albuquerque, construction, grading, asphalt and concrete paving $225,000. Plans deposit $75.

†New Mexico—GRADING, etc.—U. S. Eng., Albuquerque, grading, concrete and asphalt paving $300,000. Plans deposit $75.

†Oklahoma—ELECTRIC SYSTEM—U. S. Eng., 231 W. Main St., Denison, Tex., electric sys., fire alarm and sprinkler sys. $80,000. Plans deposit $50.

†Oklahoma — ELECTRIC SYSTEM — U. S. Eng., Albuquerque, N. M., electric sys., complete area fire alarm sys. $60,000 or more. Plans deposit $75.

†Texas—ELECTRIC SYSTEM—U. S. Eng., Albuquerque, N. M., electric sys., complete fire alarm sys. $60,000 or more. Plans deposit $75.

LOW BIDDERS

†California—IMPROVEMENTS—U. S. Eng., Wright Bldg., Sacramento, Sept. 14, imprvs., bldg., Spec. 192, from Lawrence Constr. Co., 3511 E. Curtis Park Dr., Sacramento, under **$50,000.**

†California — GASOLINE FUELING SYSTEM—U. S. Eng., Wright Bldg., Sacramento, Sept. 14, A. C. gasoline fueling sys, Spec. 202, from Trewhitt-Shields & Fisher, Pacific Southwest Bldg., Fresno, under **$50,000.**

†California—GASOLINE FUELING SYSTEM—U. S. Eng., Wright Bldg., Sacramento, Sept. 14, A. C. gasoline fueling sys., Spec. 190, from Trewhitt-Shields & Fisher, Pacific Southwest Bldg., Fresno, under **$50,000.**

†California — LIGHTING SYSTEM — U. S. Eng., 751 S. Figueroa St., Los Angeles, Sept. 12, night lighting sys., No. 241, from Drury Electric Co., 615 19 St., Bakersfield, under **$100,000.**

†California — LIGHTING SYSTEM — U. S. Eng., 751 S. Figueroa St., San Francisco, Sept. 12, night lighting sys., No. 229, from H. O. Bauerle, 8948 Ellis Ave., Los Angeles, under **$100,000.**

†California — LIGHTING SYSTEM — U. S. Eng., 751 S. Figueroa St., Los Angeles, Sept. 10, lighting sys., No. 234, from Otto K. Olesen Illuminating Co., 1560 N. Vine St., Los Angeles, under **$50,000.**

†California — GASOLINE FUELING SYSTEM—U. S. Eng., Wright Bldg., Sacramento, Sept. 17, A.C. gasoline fueling sys., Spec. 208, from Markwart Co., Forum Bldg., Sacramento, under **$50,000.**

†Louisiana—IMPROVEMENTS—U. S. Eng., foot of Prytania St., New Orleans, Sept. 15, imprvs., water distr. sys., sanitary sewer, Inv. 43-88, from Couch Constr. Co., and R. B. Tyler Co., Hammond.

Mo., Kansas City—HANGAR—L. P. Cookingham, city mgr., Sept. 15, general contract T.W.A. hangar addn., from Weeks Constr. Co., Finance Bldg., Kansas City, Mo., **$137,478.** Gentry & Voskamp, 4 W. 13 St., Kansas City, Mo., archts. Reed McKinley, City Hall, engr. CD 9/8—ENR 9/10, under LB.

New York — TUNNEL PAVING — Port of New York Auth., 111 8 Ave., New York, Sept. 15, tunnel paving, North Tube, Lincoln Tunnel, MHT 62, from Barry Contr. Corp., 226-06 139 Ave., Laurelton, **$82,127.** CD 8/25—ENR 8/27.

†Texas—CLEARING, etc.—U. S. Eng., Fort Sam Houston, about Sept. 14, clearing, grub-

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UNCLASSIFIED (Low Bidders, Cont'n.)

bing, and boundary fencing, Spec. 42-280 (A2-1) V... 1 of VII, from P. C. Stanley & E. R. Lar... 3436 Mt. Vernon St., Fort Worth. CD 9/10.

†Texas — ELECTRICAL DISTRIBUTION SYSTEM — U. S. Eng., Fort Sam Houston, about $... 14, electrical distr. sys., Spec. 42-362 (A2-... from Martin Wright Electric Co., Auditori... Circle, San Antonio. CD 9/10—ENR 9/...

†Texas — ELECTRICAL DISTRIBUTION SYSTEM — U. S. Eng., Fort Sam Houston, electrical distr. sys., Spec. 42-347 (A2-9), from J. ...mbry, Brady. CD 9/9.

†Texas — UTILITIES—U. S. Eng., Fort Sam Houston, underground utilities, Spec. 42-376 (T1-15), from Wharmund-Logan Co., 422 Hays St., San Antonio.

CONTRACTS AWARDED

†**Alabama** — LIGHTING SYSTEM — U. S. Eng., Courthouse & Customhouse, Mobile, Ala., lighting sys., Houston Co., to J. R. Hime Electric Co., 376 S. County Rd., Palm Beach, Fla., under **$50,000.**

†**Arkansas**—ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Gay Bldg., Little Rock, overhead electrical distr. sys., to Matt S. Caroll, Homer, La. Est. under **$50,000.**

★†**Arkansas**—RANGE—U. S. Eng., P. O. Box 97, Memphis, Tenn., pistol and skeet range, to C. A. Stuck & Sons, Jonesboro, under **$1,000,000.**

†**Arizona** — CONSTRUCTION — U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., misc. construction, Yuma Co., to Caloweil Constr. Co., Long Beach, Calif., **$100,000-$500,000.**

†**Arizona**—INSULATING, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., insulating, heating, air-conditioning, Maricopa Co., to Air Conditioning Co. of Southern Calif., 1003 S. Sante Fe Ave., Los Angeles, under **$50,000.**

†**Arkansas** — ACCESS RAILROAD — U. S. Eng., Gay Bldg., Little Rock, access railroad, Pulaski Co., to D. F. Jones Constr. Co., Inc., Southern Natl. Bldg., Little Rock, under **$50,000.**

†**California**—ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., 751 S. Figueroa St., Los Angeles, electrical distr. sys., Kern Co., to Electric & Machinery Service, 424 E. 3 St., Los Angeles, under **$50,000.**

†**California** — FLATTOPPING, etc. — U. S. Eng., 751 S. Figueroa St., Los Angeles, flattopping and painting, Los Angeles Co., to A. O. Miller Co., 1920 W. 7 St., Los Angeles, under **$100,000**; and to G. A. Bell, Bway. Bldg., San Diego, under **$50,000.**

★†**California** — IMPROVEMENTS — U. S. Eng., 751 S. Figueroa St., Los Angeles, imprvs., interior shops in Repair Bldg. 226, to Robt. E. McKee, 4700 San Fernando Rd. W., Los Angeles, under **$1,000,000.** CD 8/21.

†**California**—MOTOR FUEL FACILITIES—U. S. Eng., 751 S. Figueroa St., Los Angeles, motor fuel facilities, Santa Barbara Co., to Andrew Nordin & Eric Flodine, Los Angeles, **$50,000-$100,000.**

†**California**—PAINTING—U. S. Eng., 74 New Montgomery St., San Francisco, camouflage painting, to Foster & Kleiser Co., 1675 Eddy St., San Francisco. Awarded 9/18.

†**California**—PIPELINE—U. S. Eng., 751 S. Figueroa St., Los Angeles, removal of pipeline and installation, Los Angeles Co., to Southern California Edison Co., 601 W. 5 St., Los Angeles, under **$50,000.**

†**California** — GASOLINE DISTRIBUTION SYSTEM, etc.—U. S. Eng., 74 New Montgomery St., San Francisco, addnl. gasoline distr. sys., crew shelters, to Carrico & Gautier, 365 Ocean Ave., San Francisco. Awarded 9/16.

†**California**—HOLD YARD—U. S. Eng., 74 New Montgomery St., San Francisco, hold yard, to Southern Pacific Co., 65 Market St., San Francisco. Awarded 9/15.

California — IMPROVEMENTS — Industrial Company, imprvs., prefabrication steel substation, to Willis F. Lynn, 1037 Ashmount Ave., Oakland; frame timber mock-up roof, to Midstate Constr. Co., 251 Kearny St., San Francisco. CD 9/9—ENR 9/17.

California — IMPROVEMENTS — Industrial Company, imprvs., bldgs., to Macco-Case Constr. Co., Berth 240, Gate 2, South's Island, San Pedro. Est. over **$40,000.**

†**California**—IMPROVEMENTS—U. S. Eng., 74 New Montgomery St., San Francisco, imprvs., housing utilities, to Underground Constr. Co., 354 Hobart St., Oakland. Awarded 9/14.

†**California**—IMPROVEMENTS—U. S. Eng., 74 New Montgomery St., San Francisco, imprvs., addnl. drainage, imprv. levees, to D. W. Nicholson, 1701 San Leandro Blvd., San Leandro, and John J. Moore, 354 Hobart St., Oakland.

†**Connecticut**—ELECTRICAL WORK—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., electrical work, Hartford Co., to Coken Co., 233 Richmond St., Providence, R. I., under **$50,000.**

†**Conn., Stratford** — HANGAR, etc.—Vought-Sikorsky Div. United Aircraft Corp., 550 Main St., service and maintenance hangar, to Edwin Moss & Son, Inc., 555 Grant St., Bridgeport. Est. **$500,000.** Albert Kahn Associate Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., engrs.

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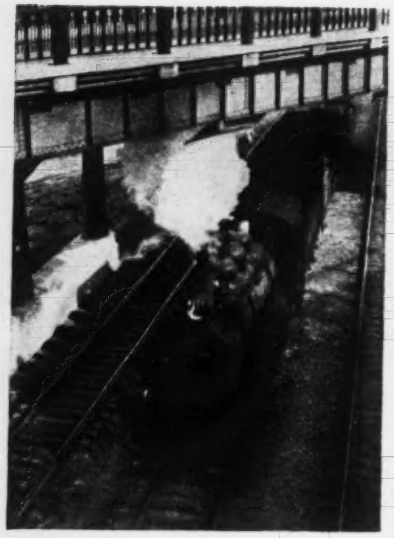

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UNCLASSIFIED (Contracts Awarded, Cont'd.)

†**Delaware**—ELECTRICAL SERVICES, etc.—U. S. Eng., Penn-Mutual Bldg., Phila., Pa., electrical and water services, New Castle Co., to William D. Shellady, Inc., 1015 Lance Ave., Wilmington, under **$50,000.**

†**Florida** — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Postoffice & Courthouse, Jacksonville, electrical distr. sys., Dixie Co., to Johnson & Gormly, Jacksonville, under **$50,000.**

†**Florida** — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Courthouse & Postoffice, Jacksonville, electrical distr. sys., Hernando Co., to Bigby Electric Co., Inc., 305 Franklin St., Tampa, under **$50,000.**

Florida — ELECTRICAL SYSTEM — U. S. Eng., Courthouse & Postoffice, Jacksonville, electrical distr. sys., Highlands Co., to Lipscomb Electric Co., Lakeland, under **$50,000.**

†**Florida** — ELECTRICAL DISTRIBUTION U. S. Eng., Courthouse & Customhouse, Mobile, Ala., gasoline fueling sys., Okaloosa Co., to Kenneth Fulghum, Thiesen Bldg., Pensacola, under **$50,000.**

†**Florida**—GASOLINE STORAGE SYSTEM—U. S. Eng., Courthouse and Postoffice, Jacksonville, gasoline storage and fueling sys., Polk Co., to Lee R. Sheffield, 610 4 St. N., St. Petersburg, under **$50,000.**

†**Florida**—HANGAR—U. S. Eng., Courthouse & Postoffice, Jacksonville, wood hangar, Orange Co., to G. A. Hanson Co., Inc., 1st Natl. Bank Bldg., Tampa, under **$50,000.**

†**Florida**—HANGARS—U. S. Eng., Courthouse & Customhouse, Mobile, Ala., hangars, Okaloosa Co., to Algernon Blair, 1st Natl. Bank Bldg., Montgoemry, Ala., **$100,000-$500,000.**

†**Florida**—RUNWAY PAVING, etc.—U. S. Eng., Courthouse & Postoffice, Jacksonville, paving runways, taxiways, Dixie Co., to James H. Craggs Constr. Co., Ocala, **$50,000-$100,000.**

★†**Florida** — RUNWAYS, etc.—U. S. Eng., Courthouse & Postoffice, Jacksonville, runways, apron, taxiways, hardstandings, Taylor Co., to Hubbard Constr. Co., Orlando, **$500,000-$1,000,000.**

†**Florida**—RUNWAYS, etc.—U. S. Eng., Courthouse & Postoffice, Jacksonville, paving runways, aprons, hardstandings, Taylor Co., to Wainer Constr. Co., Valdosta, **$100,000-$500,000.**

†**Florida**—SPUR TRACK—U. S. Eng., Courthouse & Postoffice, Jacksonville, spur track, Sarasota Co., to John R. Powell, Fort Myers, under **$50,000.**

†**Florida**—TAXIWAYS, etc.—U. S. Eng., Courthouse & Postoffice, Jacksonville, clearing, grubbing for taxiways, hardstandings, Palm Beach Co., to Cleary Bros. Constr. Co., Georgia Ave., West Palm Beach, under **$50,000.**

†**Florida**—CAR WASHING RACKS—U. S. Eng., Courthouse & Postoffice, Jacksonville, car washing racks, facilities, to B. B. McCormick & Sons, Graham Bldg., Jacksonville, under **$100,000.** Awarded 9/8.

†**Florida**—CLEARING—U. S. Eng., Courthouse & Postoffice, Jacksonville, clearing, Alachua Co., to Cuthbert V. Mize, Gainesville, under **$50,000.**

†**Florida**—COMPASS SWINGING BASE—U. S. Eng., Courthouse & Postoffice, Jacksonville, compass swinging base, Orange Co., to Johnson & Mann, Walgreen Bldg., St. Petersburg, under **$100,000.** Awarded 9/12.

†**Florida** — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Courthouse & Postoffice, Jacksonville, electrical distr. sys., Polk Co., to Lipscomb Electric Co., Lakeland, under **$100,000;** clearing, grubbing, paving, Polk Co., to Sutton Constr. Co., Lakeland, under **$100,000.** Awarded 9/12.

†**Florida** — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Courthouse & Postoffice, Jacksonville, electrical distr. sys., Lake Co., to Lipscomb Electric Co., Lakeland, under **$50,000.**

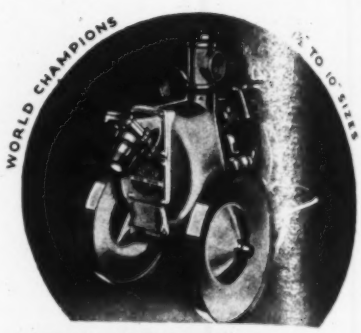
†**Florida** — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Courthouse & Postoffice, Jacksonville, electrical distr. sys., Pasco Co., to Lipscomb Electric Co., Lakeland, under **$50,000.**

†**Florida**—ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., Courthouse & Postoffice, Jacksonville, electrical distr. sys. addn., to C. M. Gudgeon, Jacksonville, under **$100,000.** Awarded 9/8.

†**Florida**—ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., Courthouse & Postoffice, Jacksonville, electric distr. sys., to Ingall Electric Co., 961 S.W. 2 St., Miami, under **$100,000.** Awarded 9/8.

†**Florida**—FENCES—U. S. Eng., Courthouse & Postoffice, Jacksonville, fences, Palm Beach Co., to Clyde J. Keys, First Federal Bldg., St. Petersburg, under **$100,000.** Awarded 9/13.

†**Florida** — FOUNDATIONS — U. S. Eng., Courthouse & Customhouse, Mobile, Ala., concrete instrument foundations, Okaloosa Co., to Cooper Bros. Const. Co., Selma, Ala., under **$100,000.** Awarded 9/12.



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STREETS, etc. (Contracts Awarded, Cont'd.)

†**Florida**—GASOLINE FUELING SYSTEM—U. S. Eng., Courthouse & Customhouse, Mobile, Ala., gasoline fueling sys., Franklin Co., to Gulf City Constr. Co., Mobile, Ala., **$50,000-$100,000.**

†**Florida**—HEATING SYSTEM—U. S. Eng., Courthouse and Postoffice, Jacksonville, gas-fired heating sys., to Brearly Plumbing Co., 824 N.W. 75 St., Miami, under **$100,000.** Awarded 9/9.

†**Florida**—IMPROVEMENTS—U. S. Eng., Courthouse and Postoffice, Jacksonville, imprvs., **WPA. $398,742.**

†**Florida** — IMPROVEMENTS — U. S. Eng., Courthouse & Postoffice, Jacksonville, imprvs., Lee Co., to W. Armston Co., Duneden, under **$100,000.** Awarded 9/13.

†**Florida**—OIL SYSTEM, etc. — U. S. Eng., Courthouse & Postoffice, Jacksonville, oil storage and distr. sys., to J. O. Carlile, Tallahassee, under **$100,000.** Awarded 9/8.

†**Florida**—PAINTING—U. S. Eng., Courthouse & Postoffice, Jacksonville, tonedown painting military bldgs., Leon Co., to Hodges Builders Supply Co., Albany, Ga., under **$100,000.** Awarded 9/12.

†**Florida**—RAILROAD SPUR—U. S. Eng., Courthouse & Postoffice, Jacksonville, railroad spur track, Polk Co., to Sutton Constr. Co., Lakeland, under **$100,000.** Awarded 9/13.

†**Florida**—RIFLE RANGE—U. S. Eng., Courthouse & Postoffice, Jacksonville, rifle range, post prison, Orange Co., to Lester T. Prew, Miami, under **$100,000.** Awarded 9/13.

†**Florida**—SEEDING and PLANTING—U. S. Eng., Courthouse & Postoffice, Jacksonville, seeding and planting Martin Co., to Moyton Landscape Co., Palm Beach, under **$100,000.** Awarded 9/12.

†**Florida**—SPRIGGING, etc.—U. S. Eng., Courthouse & Postoffice, Jacksonville, sprigging, seeding, Palm Beach Co., to Island Landscape Co., Inc., Palm Beach, under **$100,000;** air raid alarm equip., Palm Beach Co., to Rockledge Electric Co., Rockledge, under **$100,000.** Awarded 9/12.

†**Florida** — TARGET BUTTS — U. S. Eng., Courthouse & Postoffice, Jacksonville, target butts, Sarasota Co., to Johnson & Mann, Walgreen Bldg., St. Petersburg, under **$100,000.** Awarded 9/12.

†**Florida**—TARGET BUTTS—U. S. Eng., Courthouse & Postoffice, Jacksonville, target butts, Highlands Co., to Johnson & Mann, Walgreen Bldg., St. Petersburg, under **$100,000.** Awarded 9/12.

†**Florida**—TARGET BUTT, etc.—U. S. Eng., Courthouse & Postoffice, Jacksonville, target butt, Lee Co., to Ryan Constr. Co., Stovall Office Bldg., Tampa, under **$100,000;** training facilities, Lee Co., to John R. Ross, Ft. Myers, under **$100,000.** Awarded 9/12.

†**Florida**—TARGET RANGE—U. S. Eng., Courthouse & Postoffice, Jacksonville, moving and reconstructing target range, Hillsborough Co., to J. R. Chambliss Co., 213 E. Oak Ave., Tampa, under **$100,000.** Awarded 9/12.

†**Florida**—TARGET RANGES—U. S. Eng., Courthouse & Postoffice, Jacksonville, target ranges, Lee Co., to Means Constr. Co., Duval Bldg., Jacksonville, under **$100,000.** Awarded 9/13.

†**Georgia**—PAINTING—U. S. Eng., Postoffice Bldg., Savannah, painting bldgs., Chatham Co., to W. L. Fletcher, Inc., West Palm Beach, Fla., under **$100,000.** Awarded 9/12.

†**Georgia**—REMOVING TREES—U. S. Eng., Courthouse & Customhouse, Mobile, Ala., clearing, removing trees, Decatur Co., to C. O. Fiveash, Bainbridge, under **$50,000.**

†**Idaho**—GASOLINE STORAGE SYSTEM—U. S. Eng., Pittock Blk., Idaho, gasoline storage and fueling sys., Bannock Co., to Central Calif. Constr. Co., 115 Burrows St., San Francisco, Calif., **$50,000-$100,000.**

†**Illinois** — CONSTRUCTION — U. S. Eng., Clock Tower Bldg., Rock Island, misc. construction, Carroll Co., to O. Joegensen & Sons, Clinton, La., **$50,000-$100,000.**

†**Illinois**—PAINTING—U. S. Eng., 800 Courthouse & Customhouse, St. Louis, Mo., painting, to Joseph Ward Painting Co., 3110 Easton Ave., St. Louis, Mo. Est. under **$50,000.**

†**Illinois**—TOWER, etc.—U. S. Eng., 520 Merchandise Mart, Chicago, tower, steel storage tank, Cooke Co., to Brooks Erection Co., 4719 Delmar St., St. Louis, Mo., under **$50,000.**

†**Indiana**—FIELD—U. S. Eng., 612 Federal Bldg., Louisville, Ky., auxiliary field, Jackson Co., to Geo. H. Cheek, Frankfort, Ky., **$100,000-$500,000.**

†**Indiana**—MONORAILS, etc.—U. S. Eng., 520 Merchandise Mart, Chicago, Ill., monorails, tramrail, Lake Co., to Richards-Wilcox Mfg. Co., Aurora, Ill. under **$50,000.**

†**Kansas**—TEST TRACK—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., vehicular test track, to Leo M. Bauer, 534 Free Press Bldg., Detroit, Mich., under **$50,000.**

†**Kansas** — ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., Albuquerque, N. M., electrical distr. sys., Ford Co., to Wedell & Shrum Electric Co., Great Bend, under **$50,000.**

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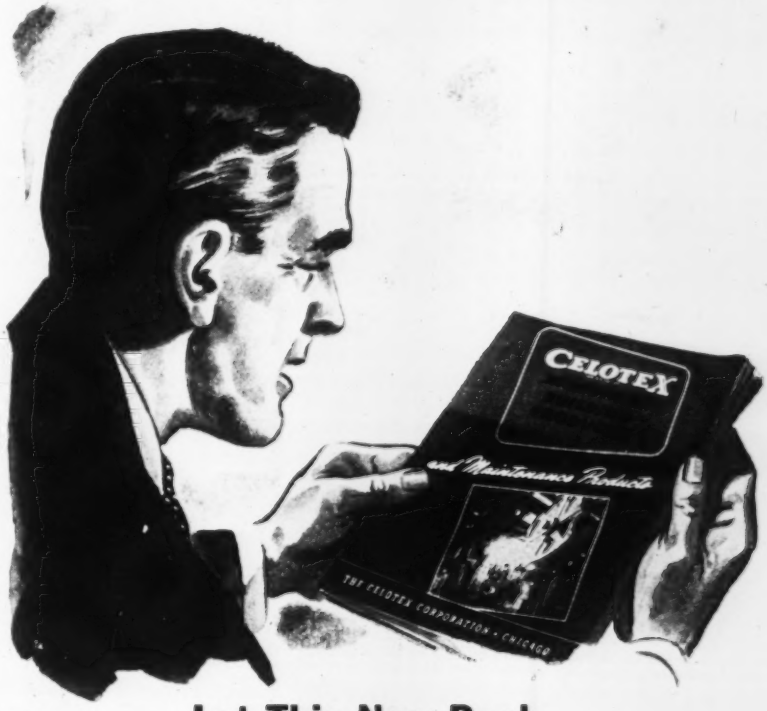

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Kan., Hays—HANGAR—P. T. School, D. Pratt, pres., Hays, native stone hangar and shop, at Gort State College, day labor. **$200,000.**

†**Kentucky** — LIGHTING SYSTEM — U. S. Eng., 612 Federal Bldg., Louisville, lighting sys., McCracken Co., to Wood Electrical Constr. Co., 623 E. 40 St., Chicago, Ill., under **$50,000.**

†**Kentucky** — LIGHTING SYSTEM — U. S. Eng., 612 Federal Bldg., Louisville, lighting sys., Warren Co., to Marion Electric Co., 605 W. Washington St., Chicago, Ill., under **$50,000.**

Louisiana—OIL WELL—Hunt Oil Co., Santa Fe Bldg., Dallas, Tex., drilling, casing, developing 6,000 ft. oil well, to Penrod Drilling Co., Santa Fe Bldg., Dallas, Tex., approx. **$80,000.** CD 9/1—ENR 9/3.

★ †**Louisiana**—ELECTRIC SYSTEM, etc.—U. S. Eng., foot of Prytania St., New Orleans, electric sys., street lighting, to M. S. Carroll Co., DeRidder. Est. under **$1,000,000.**

†**Louisiana**—IMPROVEMENTS—U. S. Eng., foot of Prytania St., New Orleans, imprvs., housing, Inv. 43-84, to Le Blanc Bros., Baton Rouge. Awarded 9/15.

★ †**Louisiana**—FUELING SYSTEM—U. S. Eng., foot of Prytania St., New Orleans, fueling sys., to Perillat-Rickey Constr. Co., Baton Rouge. Est. under **$1,000,000.**

★ †**Louisiana**—MOTOR FUEL SYSTEMS—U. S. Eng., foot of Prytania St., New Orleans, motor fuel sys., to Levassuer, Davenport & Allen, 446 Linden St., Shreveport. Est. under **$1,000,000.**

Maine—IMPROVEMENTS—Industrial Company, imprvs., Boiler Plant 2 and Substation 3, to H. F. Cummings Constr. Co., Winthrop; electric work, by own forces. Total est. **$60,000.** Bids 9/8.

†**Maine**—PLANTING TREES—U. S. Eng., Park Square Bldg., Boston, Mass., planting trees, Penobscot Co., to Harlan P. Kelsey, Inc., E. Boxford, Mass., under **$50,000.**

†**Maine**—PLANTING TREES—U. S. Eng., Park Square Bldg., Boston, Mass., planting trees, Aroostook Co., to Bartlett Tree Expert Co., 795 Memorial Dr., Cambridge, Mass., under **$50,000.**

Maryland — IMPROVEMENTS — Industrial Company, imprvs., bldgs., etc., to Consolidated Eng. Co., 20 E. Lexington St., Baltimore, and Cummins Constr. Corp., 803 Cathedral St., Baltimore.

★ †**Maryland**—IMPROVEMENTS—U. S. Eng., 1 and Douglas Sts., Wash., D. C., imprvs., to Brann & Stuart, Broad St. Station Bldg., Phila., Pa. Est. over **$3,000,000.** Gannett, Eastman & Fleming, Inc., 600 N. 2 St., Harrisburg, Pa., archts. CD 9/9—ENR 9/17.

†**Massachusetts** — CONSTRUCTION — U. S. Eng., Park Square Bldg., Boston, general construction work, to E. Turgeon, 614 Turks Head Bldg., Boston. Bids 9/11. CD 9/8.

†**Massachusetts** — IMPROVEMENTS — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., imprvs., Inv. 699-43-54, to Lane Constr. Co., 37 Colony St., Meriden, Conn. Est. **$150,000-$300,000.** Bids 9/16.

†**Massachusetts**—LIGHTING SYSTEM—U. S. Eng., Park Square Bldg., Boston, electric lighting sys., Inv. 175-43-Neg. 66, to Anderson-Coffey Co., 22 Shawmut St., Boston. Bids 9/12.

†**Massachusetts**—LIGHTING SYSTEM—U. S. Eng., Park Square Bldg., Boston, lighting sys., Inv. 175-43-Neg. 71, to Kenworthy & Taylor, Inc., 11 Spaulding St., Everett. Bids 9/17.

★ †**Michigan**—AERIAL ELECTRICAL DISTRIBUTION—U. S. Eng., 700 Union Guardian Bldg., Detroit, aerial electrical distr., Alpena Co., to Clifton Eng. Co., P. O. Box 223, Three Rivers, under **$1,000,000.**

★ †**Michigan** — ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., 700 Union Guardian Bldg., Detroit, electric distr. sys., Chippewa Co., to R. C. Martin Co., 6532 Hamilton St., Detroit, under **$1,000,000.**

★ †**Michigan**—GASOLINE FUELING SYSTEM—U. S. Eng., 700 Union Guardian Bldg., Detroit, gasoline fueling sys., Chippewa Co., to H. B. Culbertson Co., 2842 W. Grand Blvd., Detroit, under **$1,000,000.**

★ †**Michigan**—ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., 700 Union Guardian Bldg., Detroit, aerial electrical distr. sys., Iosco Co., to R. F. Clifton, P. O. Box 223, Three Rivers, under **$1,000,000.**

†**Minn., Pine River**—STORAGE BINS, etc.—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., grain storage bins and wood reels, to Durkee Mfg. Co., Pine River.

†**Mississippi, Georgia, Florida, Alabama**—AIR CONDITIONING SYSTEMS—U. S. Eng., Courthouse & Customhouse, Mobile, Ala., air conditioning sys., to Air Conditioning Engineers, Inc., 6 S. Water St., Mobile, Ala., under **$50,000.**

†**Mississippi**—GASOLINE FUELING SYSTEM—U. S. Eng., Courthouse & Customhouse, Mobile, Ala., gasoline fueling sys., Harrison Co., to Wm. F. Kelly Co., Inc., 134 Carondelet St., New Orleans, La., **$50,000-$100,000.**

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UNCLASSIFIED (Contracts Awarded, Cont'd.)

†**Mississippi**—OIL STORAGE and DISPENSING SYSTEM—U. S. Eng., Postoffice & Courthouse, Vicksburg, oil storage and dispensing house, to S. S. Richard, Jackson, under **$50,000.**

†**Missouri**—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., constr. imprvs., Pulaski Co., to O'Dell & Riney Constr. Co., Inc., Hannibal, **$100,000-$500,000.**

★†**Missouri**—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., imprvs., to Jensen Const. Co., 600 Natl. Bldg., and Lock Constr. Co., 809 Metropolitan Bldg., both Minneapolis, Minn., **$1,000,000-$5,000,000.**

†**Missouri**—GASOLINE FUELING SYSTEM—U. S. Eng., Courthouse & Customhouse, St. Louis, gasoline fueling sys., Maries Co., to Aqua Systems, Inc., 385 Gerard Ave., New York, N. Y., under **$50,000.**

†**Missouri**—IMPROVEMENTS—U. S. Eng., Courthouse & Customhouse, St. Louis, taxiways, Maries Co., to R. B. Potashnick & Regenhardt Constr. Co., Cape Girardeau, **$100,000-$500,000.**

★†**Missouri**—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., imprvs., to Great Lakes Dredge & Dock Co., 122 S. Michigan St., Chicago, Ill. Est. approx **$1,300,000.** CD 9/11—ENR 9/17.

†**Missouri**—IMPROVEMENTS—U. S. Eng., 800 Courthouse & Customhouse, St. Louis, imprvs., to Townsco Contg. Co., 1704 N.W. 6 St., Oklahoma City, Okla. Est. under **$50,000.**

★†**Missouri**—IMPROVEMENTS—U. S. Eng., 601 Davidson Bldg., Kansas City, imprvs., bldgs., to Sauer-Weiner & McClusky, St. Paul, Minn. Total est. **$2,000,000.** CD 8/25—ENR 8/27.

†**Nebraska**—ELECTRICAL CONSTRUCTION—U. S. Eng., 1709 Jackson St., Omaha, imprvs., electrical construction, to Clifton Eng. Co., Three Rivers, Mich.

†**Nebraska**—ELECTRICAL CONSTRUCTION—U. S. Eng., 1709 Jackson St., Omaha, imprvs., electrical construction, to C & W Contg. Co., Alliance. CD 9/14—ENR 9/17.

†**Nebraska**—ELECTRICAL CONSTRUCTION—U. S. Eng., 1709 Jackson St., Omaha, imprvs., electrical constr., to Crawford Electric Co., North Platte. CD 9/16—ENR 9/24, under CA.

†**Nebraska** — ELECTRICAL WORK — U. S. Eng., 1709 Jackson St., Omaha, imprvs., electrical work, to Schneider Electrical Works, 1108 Farnam St., Omaha. CD 9/10—ENR 9/17.

†**Nebraska**—ELECTRICAL CONSTRUCTION U. S. Eng., 1709 Jackson St., Omaha, imprvs., electrical work, to Schneider Electrical Works, 1108 Farnam St., Omaha. CD 9/10—ENR 9/17.

†**Nebraska**—FENCES—U. S. Eng., 1709 Jackson St., Omaha, boundary fences, removal of existing fences, Brown Co., to Bradley Dodson Sterling Electric Co., Omaha, under **$50,000.**

†**Nebraska**—RAILROAD SPUR—U. S. Eng., 1709 Jackson St., Omaha, railroad spur, Brown Co., to Harry Noel, Spencer, Ia., under **$50,000.**

†**Nebraska**—IMPROVEMENTS—U. S. Eng., 10 E. 17 St., Kansas City, Mo., imprvs., bldgs., etc., to Patti-McDonald Constr. Co., 114 Bway., Kansas City, Mo. Est. **$2,500,000.** CD 9/9—ENR 9/17.

†**Nebraska** — SPRINKLER SYSTEM — U. S. Eng., 1709 Jackson St., Omaha, automatic sprinkler sys., Box Butte Co., to Walton-Viking Co., Alliance. Est. under **$50,000.**

†**Nevada** — IMPROVEMENTS — U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., imprvs., addnl. construction, repairs, to C. J. Paradis, 2320 Idell St., Los Angeles, Calif., under **$50,000.** Awarded 9/7.

†**New Hampshire** — PLANTING TREES — U. S. Eng., Park Square Bldg., Boston, Mass., planting trees, Hillsboro Co., to Davey Tree Expert Co., 1115 Statler Bldg., Boston, Mass., **$50,000-$100,000.**

†**New Jersey**—CONSTRUCTION—U. S. Eng., 6 and Walnut Sts., Phila., Pa., miscellaneous construction, Atlantic Co., to M. B. Markland Contg. Co. Inc., 1325 Boardwalk, Atlantic City, under **$50,000.**

†**New Jersey**—LANDSCAPING, etc.—Pub. Housing Auth., NHA, 270 Bway., New York, N. Y., landscaping, excav., backfilling, grading, **WPA, $79,643.** D. Haining, 930 Atlantic Ave., Atlantic City, WPA engr.

†**New Jersey**—PLANTING, etc.—U. S. Eng., 120 Wall St., New York, N. Y., planting and Painting, Passaic Co., to Lewis & Valentine Landscape Corp., 145 Post Rd., Rye, N. Y. and Weny Bros. and Storms Co., 241 Lafayette St., Paterson, **$100,000-$500,000.**

†**New Mexico**—ELECTRICAL DISTRIBUTION—U. S. Eng., Albuquerque, addnl. electrical distr. sys., etc., to Sampson Electric Co., 1235 La Brea Ave., Los Angeles, Calif., **$50,000-$100,000.**

†**New Mexico**—GASOLINE FUELING SYSTEM—U. S. Eng., Albuquerque, gasoline fueling sys., Bernalillo Co., to Aqua Systems, Inc., 385 Gerard Ave., New York, N. Y., under **$50,000.**

†**New York**—PLANTING, etc.—U. S. Eng., 120 Wall St., New York, planting and soil mixtures, Queens Co., to Horticulture Co., 104 Park Ave., New York, **$50,000-$100,000.**

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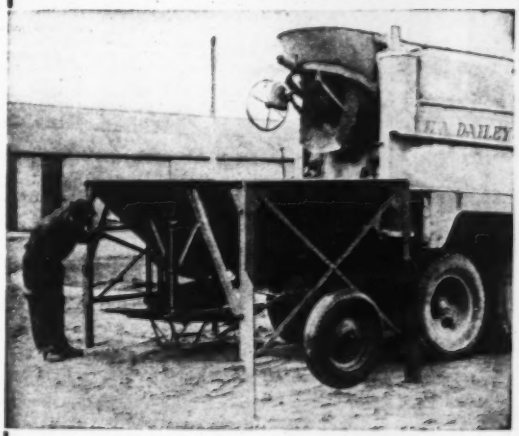

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UNCLASSIFIED, etc. (Contracts Awarded. Cont'd.)

†**New York**—TRAILER CAMP SITE—Farm Security Admin., The Mall, bet. 12 and 14 Sts. S.W., Wash., D. C., trailer camp site, roads, parking spaces, walkways, lighting facilities, etc., to W. Bouley, Auburn. Est **$30,000.**

★†**New York**—TAXIWAYS, etc.—U. S. Eng., Chimes Bldg., Syracuse, taxiways, hardstandings, roads, water and sewerage sys., Onondaga Co., to Elmhurst Contg. Co., 5309 97 Rt., Corona, **$1,000,000-$5,000,000;** heating facilities, Onondaga Co., to Central City Engineering Co., Inc., 560 East Genesee St., Syracuse, under **$50,000.**

†**New York**—CONSTRUCTION, etc.—U. S. 120 Wall St., New York, construction, Queens Co., to Andrew Weston Co. Inc., 158 Irving Pl., Woodmere, **$100,000-$500,000;** painting and road treatment, Queens Co., to Great Eastern Const. Co. Inc., 110 W. 40 St., New York, under **$50,000.**

†**North Carolina**—ELECTRICAL DISTRIBUTION SYSTEM—U. S. Eng., 308 Customhouse, Wilmington, electrical distr. sys., to A. J. Jenkins, Warsaw, under **$50,000.** Bids 9/7.

†**North Carolina**—SPRIGGING, etc.—U. S. Eng., 308 Customhouse, Wilmington, sprigging and seeding, Cumberland Co., to Howard-Hickory Co., Inc., Hickory, under **$50,000.**

†**North Carolina**—WOODEN RAMPS—U. S. Eng., 308 Customhouse, Wilmington, wooden ramps, Durham Co., to S. R. Lee, 219 S. West St., Raleigh, under **$50,000.**

†**N. D., Dickinson**—GRADING—City, grading, and earthwork, for airport, to Albert Lalonde Constr. Co., Glasgow, Mont. CAA. L. W. Veigle, city engr.

†**Ohio**—RAILROAD SIDING—U. S. Eng., Wright Field, Dayton, railroad siding, Greene Co., to Erie Railroad Co., Fairfield, under **$50,000.**

†**Oklahoma**—TEMPERATURE CONTROL—U. S. Eng., 416 Wright Bldg., Tulsa, temperature control, Oklahoma Co., to Powers Regulator Co., 2720 N. Greenview St., Chicago, Ill., **$100,000-$500,000.**

★†**Oregon** — IMPROVEMENTS — Industrial Company, imprvs., to Gilpin Constr. Co., 5500 N.W. Front St., Portland, **$450,000,** awarded Sept. 8; bldg., to R. Horwitz, 1835 N.W. Flint St., Portland, **$60,000,** awarded Sept. 7. Federally financed.

†**Oregon**—REMOVING RAILROAD SPUR—U. S. Eng., Pittock Blk., Portland, removing railroad spur, Benton Co., to Parker-Schram Co., Couch Bldg., Portland, under **$50,000.**

†**Pennsylvania**—HEAT INSULATION—U. S. Eng., Chimes Bldg., Syracuse, N. Y., heat insulation, Lycoming Co., to Nicely Corp., Delaware and Fairmount Aves., Phila., **$100,000-$500,000.**

†**Rhode Island**—TOPSOILING—Pub. Bldgs. Admin., North Interior Bldg., Wash., D. C., topsoiling, seeding, sodding, etc., to New England Tree Expert Co., Inc., 539 Smithfield Ave., Pawtucket. **$45,352.**

†**Rhode Island**—UTILITIES—U. S. Eng., 819 Industrial Trust Bldg., Providence, utilities, water, sewers, etc., for housing, to G. E. Duteau, 90 Cloran St., Springfield, Mass. Est. over **$25,000.**

★†**South Carolina** — HARDSTANDING AREAS, etc.—U. S. Eng., 33 Customhouse, Charleston, hardstanding areas, Richmond Co., to B. A. Jordon, Jr., Eastover, **$50,000-$100,000;** grading, drainage, Richland Co., to Boyle Constr. Co., and Davis Moragne, Sumter, **$500,000-$1,000,000.**

†**South Carolina**—TAXIWAY—U. S. Eng., 33 Customhouse, Charleston, taxiway, Richland Co., to W. F. Bowe, Jr., Augusta, Ga. **$100,000-$500,000.**

†**South Dakota**—SEEDING, etc.—U. S. Eng., 1709 Jackson St., Omaha, Neb., seeding, Minnehaha Co., to C. E. Weir, 930 S. Phillips St., Sioux Falls, under **$50,000;** chlorinating equip., Minnehaha Co., to Everson Mfg. Co., 214 W. Huron St., Chicago, Ill., under **$50,000.**

†**South Dakota** — UTILITIES — U. S. Eng., 1709 Jackson St., Omaha, Neb., outside utilities, Hughes Co., to Rue Constr. Co., Fargo, N. D., **$100,000-$500,000.**

†**Tennessee**—LIGHTING SYSTEM— U. S. Eng., 306 U. S. Courthouse, Nashville, night lighting sys., Coffee Co., to Electrical Constr. Co., Columbus, Ga., under **$50,000.**

†**Tennessee**—TANK—U. S. Eng., P. O. Box 97, Memphis, steel tank, Dyer Co., to I. L. Starkey, Gladewater, Tex., under **$50,000.**

†**Tennessee**—STORAGE TANK—U. S. Eng., 306 U. S. Courthouse, Nashville, storage tank, Maury Co., to Buffalo Tank Corp., 153 Lincoln Ave., Lackawanna, Buffalo, N. Y., under **$50,000.**

Tenn., Memphis—TRANSMISSION LINES, etc.—City, Light, Gas & Water Div., 179 Madison Ave., 5 mi. wood pole transmission, 4 mi. feeder lines, step-down substation, own forces, **$185,170.** CD 9/16.

†**Texas**—AIR-CONDITIONING—U. S. Eng., 231 W. Main St., Denison, air-conditioning bldgs., to AAA Air-Conditioning Corp., Love Field, Dallas, **$50,000-$100,000.**

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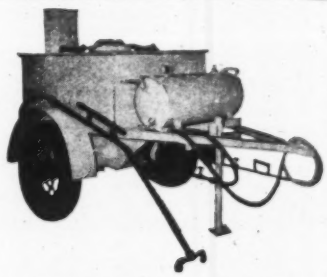

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†**Texas**—BOUNDARY FENCE—U. S. Eng., Fort Sam Houston, boundary fence, Tex. 42-233, to Texas Foundation Co., 3901 Hemphill St., Fort Worth, under **$50,000**

†**Texas**—CLEARING, etc.—U. S. Eng., San Antonio, clearing, excav. and constructing fence, Medina Co., to R. W. Griggs & Co., Sunset Rd., San Antonio, **$50,000-$100,000.**

†**Texas**—CONSTRUCTION—U. S. Eng., San Antonio, addnl. construction, Bexar Co., to J. A. Sharrock, 1802 Lakeland Dr., Dallas, **$50,000-$100,000.**

†**Texas**—LIGHTING SYSTEM—U. S. Eng., 231 W. Main St., Denison, lighting sys., Palo Pinto Co., to Nola Electric, Inc., 826 Baronne St., New Orleans, La., under **$50,000.**

†**Texas**—UTILITIES—U. S. Eng., San Antonio, utilities, to Matagorda Co., to I. L. Holleman Plumbing Co., Bay City, under **$50,000.**

†**Texas**—UTILITIES—U. S. Eng., Fort Sam Houston, underground utilities, Spec. 42-250, exten. water distr. sys., sanitary sewerage sys., gas distr. sys. addn., installing motor fuel storage and dispensing sys., Brown Co., to Osage Const. Co., 811 Gulf States Bldg., Dallas, **$50,000-$100,000;** construction, Spec. 42-340, Brown Co., to S. O. Yarbrough & G. T. Reinhardt, 410 Navasota St., Austin, **$100,000-$500,000.** CD 9/2 and 9/15—ENR 9/10.

★†**Texas**—GRADING, etc.—U. S. Eng., 25 St. and Avenue F, Galveston, increased grading, drainage, paving, to Austin Road Co., 1313 Clarence St., Dallas, **$500,000-$1,000,000.** CD 9/10—ENR 9/17, under LB.

†**Texas**—OIL STORAGE HOUSE, etc.—U. S. Eng., Albuquerque, N. M., oil storage house and temporary frame bldgs., Lubbock Co., to M. G. Bowles, Lubbock, under **$50,000.**

†**Texas**—OIL STORAGE SYSTEM—U. S. Eng., 416 Wright Bldg., Tulsa, Okla., oil storage sys., Dallam Co., to Howerton Plumbing Co., **2017 E. Admiral Pl., Tulsa, Okla.,** under **$50,000.**

†**Texas**—RAILROAD TRACK—U. S. Eng., Albuquerque, N. M., railroad track, Ward Co., to L. Spencer, Alpine, under **$50,000.**

★†**Texas**—RAILROAD RELOCATION—U. S. Eng., 231 W. Main St., Denison, relocating **Missouri, Kansas & Texas Ry.**, Grayson Co., Inv. 257-43-38, to Gifford-Hill & Co. Inc., **Texas Bank Bldg.**, Dallas, **$500,000-$1,000,000.** Awarded 9/14. CD 9/18, under LB—ENR 8/31, under BA.

Tex., Tyler—OIL WELL—Thompson Bros. Mineral Co., Tyler, drilling, casing, developing 4,500 Wildcat Oil Well, to C. O. Holloway, Tyler, approx. **$75,000.** CD 9/1—ENR 9/3.

†**Utah**—AIR CONDITIONING SYSTEM, etc.—U. S. Eng., 32 Exchange Pl., Salt Lake City, air conditioning sys., Weber Co., to Fox & Co., Ogden, under **$50,000;** concrete construction, Weber Co., to W. W. Gardner, Salt Lake City, under **$50,000.**

†**Utah**—SHED—U. S. Eng., 32 Exchange Pl., Salt Lake City, shed, Weber Co., to Al Johnson Constr. Co., and James Leck Co., Ogden, under **$50,000.**

★†**Virginia**—CLEARING, GRADING, etc.—U. S. Eng., 415 Post Office & Court House Bldg., Norfolk, clearing, grading, grubbing, paving, Queen Co., to Grannis, Higgins, Thompson & McDevitt Co., Blackstone, **$1,000,000-$5,000,000.**

†**Virginia**—LIGHTING—U. S. Eng., 415 Post Office & Court House, lighting, Nansemond Co., to Cofer Constr. Co., Roanoke, under **$50,000.**

†**Virginia**—PAINTING—U. S. Eng., 415 Post Office and Courthouse, Norfolk, painting, Norfolk Co., to Banks & Lipman, Newport News, under **$50,000.**

†**Washington** — CONSTRUCTION — U. S. Eng., 800 3 Ave., Seattle, miscellaneous construction, Pierce Co., to A. J. Phillips Constr. Co., 402 W. 5 St., Olympia, **$50,000-$100,000.**

†**Washington**—TEST BORING—U. S. Eng., 810 3 Ave., Seattle, test boring, to R. S. McClintock, **W416 Second St., Spokane,** under **$50,000.**

†**Washington**—TRAINING SYSTEM—U. S. Eng., 810 3 Ave., Seattle, training sys., to R. L. Bair, W1220 Ide Ave., Spokane, under **$50,000.**

★†**Wisconsin**—RUNWAY, etc.—U. S. Eng., 408 Federal Bldg., Milwaukee, runway, widening strips, taxiways, drainage, appurtenances, **Milwaukee Co.**, to R. Van Vechten, Wauwatosa, **$500,000-$1,000,000.**

†**Wisconsin**—ELECTRICAL DISTRIBUTION SYSTEM, etc.—U. S. Eng., 408 Federal Bldg., Milwaukee, electrical distr. sys. and road lighting, Milwaukee Co., to Havey Electric Co., Madison, under **$50,000.**

Alta., Edmonton—AIR SCHOOL—Dpt. National Defense for Air, Ottawa, Ont., addnl. temporary accommodations, barracks, mess hall, officer quarters, etc., at No. 2 Air Observers School, to H. G. Macdonald, 612 Tegler Bldg., **$244,000.**

Alta., Medicine Hat—RUNWAYS, etc.—Dpt. Transport, Ottawa, Ont., repairing runways, drainage, etc., S.F.T. School, to Western Pavers, Ltd., Medicine Hat. Est. **$55,000.** CD 12/23.

Alta., Pearce—HANGAR—Dpt. National Defense for Air, Ottawa, Ont., addnl. hangar accommodation, No. 3 A. O. School and E.F.T. School, to Doncaster Constr. Co., Ltd., Garneau Theatre Bldg., Edmonton, **$319,000.** Bids 7/24. CD 1/28—ENR 2/5.

B. C., North Vancouver—SHIPYARD—Burrard Dry Dock Co., Ltd., North Vancouver, shipyard addn., day labor. **$283,700.** CD 4/13—ENR 4/16.

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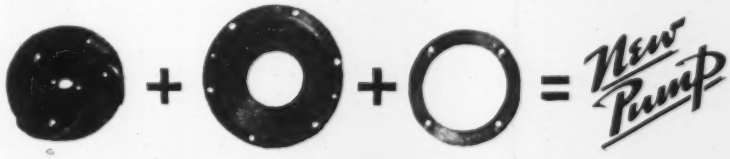

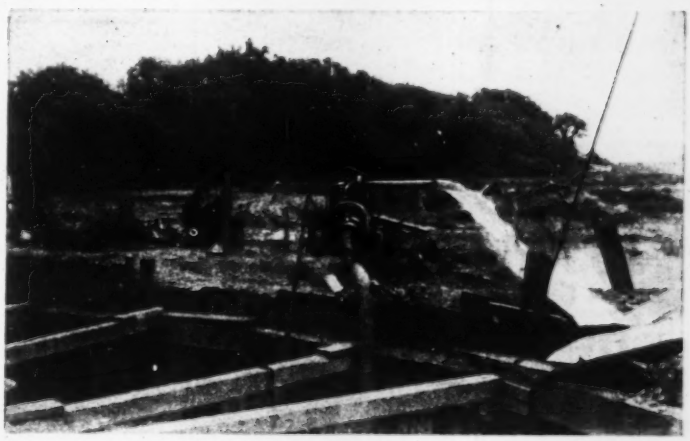

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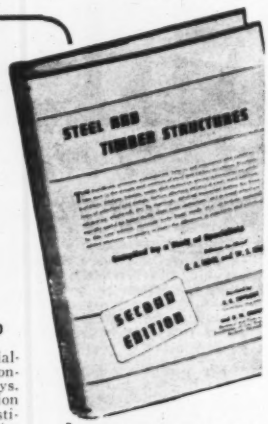

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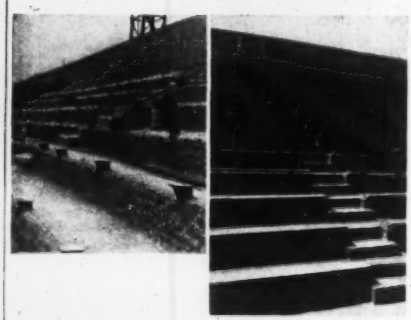

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B. C., Victoria—DEPOT—Dpt. Na... fense for Sea, Ottawa, Ont., Central ... ling Depot, at H.M.C. Dockyard, ... Shockley, Admirals St. **$49,000.**

Man., Rivers—AIRPORT—Dpt. T... Ottawa, Ont., airport development, ... grading, dragging, smoothing, dra... Long Lac Constr. Co., Ltd., Port Art... Est. **$82,000.** Bids 8/5. CD 7/29.

Ont., Dufferin—AERODROME—Dpt. ... port, Ottawa, aerodrome development ... ing, smoothing, grading, drainage, ... Armstrong Bros. Constr. Co., Ltd., ... St. N., Brampton, **$69,975.**

Ont., Ottawa—TESTING GROUNDS—Dpt. National Defense, Ottawa, addnl. devel... testing grounds, near here, to L. T. ... Ltd., 56 Sparks St., **$51,000.** Additional to CD 5/20—ENR 6/4, under CA.

P. E. I., Tignish—AIR FORCE STATION—Secy. Dpt. Munitions & Supply, Ottawa, ... temporary frame accommodations, ... mess halls, officers quarters, drill ... kitchens, etc. R. C. A. F. Station, for Dpt. Natl. Defense for Air, to Phillips & Mathe... 9 Grafton St., Charlottetown. **$75,000.** Bids 9/2.

PUBLIC BUILDINGS

PROPOSED WORK

†**Alabama**—U. S. Eng., Anniston, bldgs.

†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, engineer-architect services, by Leeds Hill, Barnard & Jewett, 601 W. 5 St., Los Angeles, bldgs., Riverside Co.

†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, engineer-architect services, by Stiles Clements, 210 W. 7 St., Los Angeles, temporary frame bldgs., Orange Co.

†**California**—Vallejo Housing Auth., Vallejo, intermediate or high school; 2 schools, and addn. to Flosden School, Calif. 4211, for NHA. $497,000 federal gr. CD 4/24—ENR 4/30.

★†**California**—Alameda Housing Auth., 1711 2 St., Alameda, plans by Andrew T. Hass, 525 Market St., San Francisco, and Carl I. Warnecke, 1700 Financial Center Bldg., Oakland, housing unit, for NHA. CD 9/18.

★†**California**—Maritime Comn., 1818 H St. N.W., Wash., D. C., bldgs. $1,000,000.

★†**California**—Moore Dry Dock Co., foot of Adeline St., Oakland, war apts. and dormitory units, $2,875,000. U. S. Maritime Comn. will finance.

★†**California**—Oakland Housing Auth., 8 and Willow Sts., Oakland, plans by John J. Donovan, 959 Parker St., Berkeley, housing units, for NHA. CD 9/18.

★†**California**—Richmond Housing Auth., Atchison Village, Richmond, addnl. housing units for NHA.

†**Calif., Indio**—Dpt. Agriculture, Guayule Rubber Project, Salinas, bids soon labor camp shelters, showers, laundry rooms, community center, etc. Charles E. Butner, 7 Winham St., Salinas, archt.

†**Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., rejected bids June 5, community bldg, sewer, water, electric utilities, Conn. 6122. CD 5/29.

★†**Conn., Bridgeport**—St. Vincents Hospital, Main St., bids soon, nurses home and hospital addn. $875,000. J. Gerard Phelan, 1336 Fairfield Ave., archt. CD 4/29—ENR 5/7.

†**Florida**—U. S. Eng., Courthouse and Post-office, engineer-architect services by Russell & Axon, Daytona Beach, school, hospital facilities.

†**Florida**—U. S. Eng., Courthouse & Post-office, Jacksonville, engineer-architect services by Maurice H. Connell & Associates, Langford Bldg., Miami, temporary frame bldgs., Collier Co.

†**Georgia**—U. S. Eng., Marietta, bldg.

†**Ga., Cusseta**—City, health center. **FWA.** Housing Architects, Columbus, archts.

†**Illinois**—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., bids soon addnl. frame bldgs.

†**Iowa**—U. S. Eng., Clock Tower Bldg., Rock Island, Ill., bldg. $102,300.

†**Kansas**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., engineer-architect services by Wyatt C. Hedrick, Inc., 1st Natl. Bank Bldg., Fort Worth, Tex., temporary frame bldgs., Shawnee Co.

PUBLIC BLDGS, etc. (Proposed Work, Cont'd.)

†**Louisiana**—Pub. Housing Auth., NHA, Electric Bldg., 7 and Taylor Sts., Fort Worth, Tex., housing.

Me., Portland—City, School Com., City Hall, bids soon, 1 story, bsmnt., 65x305 ft. and 73x95 ft. brick, granite, limestone high school, Deering and Park Ave. $450,000. Miller & Beal, Inc., 465 Congress St., archts. CD 7/1—ENR 7/9.

★†**Maryland**—Pub. Bldgs. Admin., North Interior Bldg., Wash., D. C., hospital, Project 18-148, $612,000.

Mich., Detroit—Dpt. P. Wks., 3 story, 200x180 ft. brick, steel, concrete salvage plant for handling rubbish. $300,000.

†**Minnesota**—U. S. Eng., Postoffice & Customhouse, St. Paul, engineer-architect services by Ellerbe & Co., 1st Natl. Bank Bldg., St. Paul, temporary frame bldgs., Ramsey Co.

★†**Mississippi**—U. S. Eng., Postoffice & Courthouse, Vicksburg, military installation, Panola Co. Over $2,000,000.

★†**Mississippi**—U. S. Eng., Postoffice & Courthouse, Vicksburg, engineer-architect services by Burns & McDonnell Eng. Co., 107 W. Linwood St., Kansas City, Mo., hospital. $4,000,000. CD 9/14—ENR 9/17.

★†**New York**—Elmira Housing Auth., Elmira, plans by Haskell, Considine & Haskell, Hulett Bldg., Elmira, housing, for NHA. Est. **$1,535,000.**

★†**New York**—Niagara Falls Housing Auth., Niagara Falls, plans by Association of Licensed Architects, Niagara Falls, housing, for NHA.

★†**New York**—Schenectady Housing Auth., Millard St., Schenectady, plans by Atkinson & Karas, 151 Barrett St., Schenectady, housing, for NHA.

†**N. Y., Tonawanda**—Pub. Housing Auth., NHA., 270 Bway., New York, temporary frame, 12 classroom school bldg. $157,000 FWA allot.

†**Ohio**—Fisher Body Div. General Motors Co., N. Lowney, engr., General Motors Bldg., Detroit, Mich., pump house, $100,000. Federally financed.

†**Ohio**—U. S. Eng., Wright Field, Dayton, bldgs.

O., Columbus—Ohio State Fair Bd., Columbus, plans Junior Fair Bldg. $350,000.

†**Oklahoma**—U. S. Eng., 418 Wright Ave., Tulsa, shop. $150,000.

†**Ore., Salem**—Federal Works Agency, Alaska Bldg., Seattle, Wash., renovating American Legion Bldg., for U.S.O. Center, Docket 35-149. $12,000. **FWA.**

★†**Pennsylvania** — Allegheny Co. Housing Auth., 201 County Office Bldg., Pittsburgh, brick or frame housing, Proj. 36-172, for NHA. $2,000,000.

★†**Pennsylvania**—Allegheny County Housing Auth., 201 County Office Bldg., Pittsburgh, brick or frame housing, Proj. Pa. 36-108, for NHA. $600,000. CD 4/29—ENR 6/7.

★†**Pennsylvania**—Allegheny County Housing Auth., 201 County Office Bldg., Pittsburgh, brick or frame housing, Project Pa. 36-106, for NHA. $1,600,000.

★†**Pennsylvania**—Allegheny Housing Auth., 201 County Office Bldg., Pittsburgh, brick or frame housing, Proj. Pa. 36-109, for NHA. $600,000.

†**Pa., Mechanisburg**—Pub. Housing Auth., NHA, 270 Bway, New York, N. Y., 75 unit housing, Proj. Pa. 36085. W. L. Murray, 1100 N. 2 St., Harrisburg, archt. CD 8/11—ENR 8/13.

†**South Dakota**—U.S.O. Organization, through Federal Security Agency, 4 St. and Independence Ave. S.W., Wash., D. C., recreational bldg. $115,000.

★†**Tennessee**—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., preliminary plans plant. Over $5,000,000.

★†**Tenn., Memphis**—U. S. Eng., P. O. Box 97, Memphis, expanding Kennedy General Hospital. Over $4,000,000.

†**Texas**—U. S. Eng., Marshall, bldgs. $200,000.

★†**Texas**—Dow Chemical Co., Midland, Mich., plant. $11,000,000. Defense Plant Corp. will finance.

★†**Texas**—U. S. Eng., San Antonio, camp expansion, Camp Swift. Over $2,000,000.

★†**Texas**—U. S. Eng., Southwestern Div., Cotton Exchange Bldg., Dallas, bldgs., gasoline and fueling sys., water supply, distr. sys., sanitary sewerage sys., natural gas distr. sys., facilities; outside overhead electrical distr. sys., drainage, grading, etc. Over $4,000,000.

†**Tex., El Paso** — El Paso Hospital, c/o F. Klaha, 748 1st Natl. Bank Bldg., plans by Trost & Trost, El Paso Natl. Bank Bldg., addn'l unit to existing hospital bldg. and nurses home, Tex. 41-522. $342,310. **FWA.** allot. CD 9/3—ENR 9/10.

†**Tex., Gainesville**—Federal Security Agency, c/o H. J. Emigh, Reg. Rep., 901 Maverick Bldg., San Antonio, recreation center, facilities, Tex. 41-568. $85,000 **FWA** funds allot.

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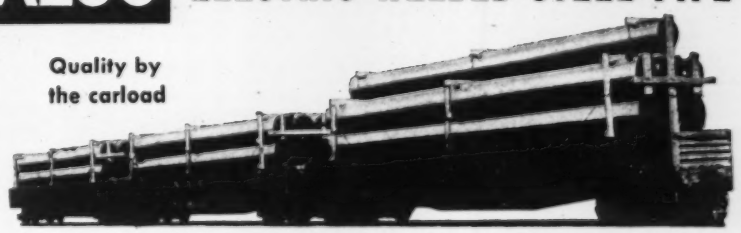

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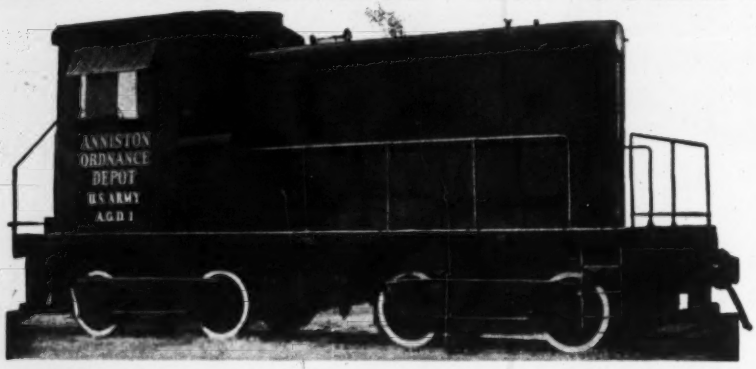

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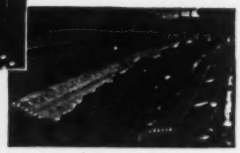

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PUBLIC BLDGS. (Proposed Work Cont'd)

†Washington—Pub. Bldgs. Admin., Interior Bldg., Wash., D. C., remodeling bldg. into U.S.O. center. $35,000. North store

Wis., Sheboygan—Sheboygan C... E. A. Stubenrauch, 708 Erie A... addn., hog barn, addnl. well, root barn, green house, machine ... quarters, slaughter house. Plans by hospital ar, horse living

†Pacific Northwest—U. S. Eng., Seattle, Wash., office bldg. and ... shop. 3 A... repairs

BIDS ASKED

Bids Asked September 29

†Pennsylvania—Allegheny Count... Auth., 201 County Office Bldg., ... housing Pa. 36105, for NHA. CD ... 9/17. Housing burgh —ENR

Bids Asked October 1

†North Carolina—Federal Works ... Richmond, Va., recreation center. ... ENR 5/7. Agency CD 4/20—

Bids Asked October 6

†N. C., Wilson—Pub. Bldgs. Admin., ... Ga., at Wilson, plaster painting, ... miscellaneous repairs, U. S. Post ... Court House. Atlanta roof and Office &

★**†Texas**—Pub. Housing Auth., NHA ... tric Bldg., demountable housing, Tex. 41172. Stone & Pitts, Goodhue Bldg., Beaumont, archts. CD 6/12—ENR 6/18. Elec

Bids Asked October 12

★**†Pennsylvania**—Pub. Housing Auth., NHA ... 270 Bway., New York, N. Y., housing, Pa. 36258. Extended date. CD 8/24—ENR 8/27.

Bids Asked October 13

La., Ville Platte—Evangeline Parish, court house addn. Theo. L. Perrier & Wogan & Bernard, 801 Barrone Bldg., New Orleans archts.

†Me., Machias—Pub. Bldgs. Admin., 1201 Customhouse, Boston, Mass., furnishing materials, performing work for approach work and repairs at postoffice and customhouse.

★**†N. J., Camden**—Pub. Housing Auth., NHA ... 270 Bway., New York, N. Y., 200 unit housing, Project N.J.-28044. Extended date. F. H. Radey, 101 N. 7 St., Camden, archt. CD 9/16—ENR 8/6.

Bids Asked October 15

†La., Lafayette—Dist. Eng. Pub. Bldgs. Admin., 550 Postoffice (new) Dallas, Tex., addnl. facilities at U. S. Postoffice.

Bids Asked October 21

★**†Pennsylvania**—Chester Housing Auth., Community Bldg., Lamokin Village, Chester, 200 unit housing, Proj. 36265, Delaware Co., for NHA. Extended date. CD 9/16—ENR 8/27.

Bids Asked

†Massachusetts—U. S. Eng., Park Square Bldg., Boston, (selected bidders), bldgs., Inv. 175-43-Neg. 76.

†New Mexico—U. S. Eng., Albuquerque, 120x200 ft., steel frame bldg. $150,000. Plans deposit $50.

†New Mexico—U. S. Eng., Albuquerque, bldgs. $200,000. Plans deposit $50.

†Texas—U. S. Eng., Fort Sam Houston, several bldgs., Spec. 42-338. $150,000. Plans deposit $25.

LOW BIDDERS

†California—Industrial Company, warehouse, pump house, reservoir, guard house, tracks, loading dock, bridge, etc., from H. W. Baum, 232 S. Van Ness Ave., Los Angeles. Est. over $40,000. D. B. Parkinson, 433 S. Spring St., Los Angeles, archt. Defense Plant Corp. will finance.

†California—U. S. Eng., 761 S. Figueroa St., Los Angeles, Sept. 9, housing, utilities, No. 223, from E. A. Kaiser Co., 8825 Olympic Blvd., Beverly Hills, under $500,000.

†California — U. S. Eng., Wright Bldg., Sacramento, Sept. 17, bldg., Spec. 213, from Robert McCarthy Co., 1050 Kirkham St., San Francisco, under $50,000.

†South Carolina—U. S. Eng., Fort Jackson, Sept. 15, bldg. addn., from W. H. Hand & Son, Belmont, N. C.

†Texas—U. S. Eng., 231 W. Main St., Denison, bldgs., Inv. 257-43-43, from B. B. Adams, 414 First Natl. Bank Bldg., Fort Worth.

†Texas—U. S. Eng., Fort Sam Houston, Sept. 12, bldgs., Spec. 42-351 (T1-14-T1-16), from H. J. Rosenberg, Builders Bldg., San Antonio. CD 9/2, under BA.

★**†Texas**—U. S. Eng., 25 St. and Avenue F, Galveston, bldgs., Contr. 2, from J. E. Townsend, 1921 Westheimer St., Houston.

PUBLIC BLDGS. (Low Bidders, Cont'd.)

$500,000-$1,000,000***grading, roads, streets, Contr. 1, from Ballentyne Eng. Co., 2112 Commerce Bldg., Houston, $100,000-$500,000*** bldgs., Contr. 3, from Pullen Co., c/o Manufacturing Assn., Houston, $100,000-$500,000 ***electrical distr. sys., outside overhead for streets, roads and general area, Contr. 4, from Taylor Constr. Co., Taylor, $50,000-$100,000*** sanitary sewerage sys., water distr. and natural gas distr., facilities, Contr. 5, from Panhandle-Sta-Dalton, 3101 Elm St., Dallas, $100,000-$500,000. CD 7/28—ENR 7/30.

†**Texas**—U. S. Eng., Fort Sam Houston, Sept. 7, bldgs. Spec. 42-335, from Abilene Constr. Co., Abilene, $100,000-$500,000. CD 9/2.

CONTRACTS AWARDED

†**Arizona**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., addnl. warehouse, Pima Co., to J. S. Sundt, Tucson, $50,000-$100,000.

†**Arizona**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., storage bldg., Pima Co., to J. S. Sundt, Tucson, under $50,000.

†**Arkansas**—U. S. Eng., Gay Bldg., Little Rock, laundry bldg., steam plant, to Petersen & McFayden, Commercial Natl. Bank Bldg., Little Rock. Awarded 9/9.

†**Ark., Norfork**—U. S. Eng., Gay Bldg., Little Rock, outside housing for power installation, to Utah Const. Co., 1 Montgomery St., San Francisco, and Morrison Knudsen Co., 300 Bway., Boise, Idaho. Est. over $1,000,000.

†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, temporary frame bldgs., to Griffith Co., Los Angeles Railway Bldg., Los Angeles, under $500,000. Awarded 9/9.

†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, bldgs., grading, paving, fencing, etc., No. 225, to H. W. Raun Constr. Co. and J. F. Cummins, 245 E. Olive Ave., Burbank, under $500,000. Awarded 9/9.

†**California**—U. S. Eng., Wright Bldg., Sacramento, electrical work for bldg., Spec. 177, to E. L. French, 1926 O St., Sacramento. CD 9/9—ENR 9/17, under LB.

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, military housing facilities, to Matthew A. Little, 1 Grand View Ave., San Francisco. Awarded 9/17.

†**Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., demountable housing units, Conn. 6037, to Prebilt Co., Revere Beach Pkwy., Revere, Mass., $490,000. Bids 9/24. CD 9/17—ENR 7/9.

†**Connecticut** — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., prefabricated bldg., to Travelodge Corp., Lynchburg, Va. Est. $150,000.

★†**Florida** — Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Ga., temporary apts., dormitories, misc. bldgs., to J. A. Jones Constr. Co., 209 W. 4 St., Charlotte, N. C. CD 7/20—ENR 8/6.

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, warehouse, gymnasium, to Palmer Engineering & Constr. Co., Cassatt Ave., Jacksonville, under $100,000. Awarded 9/9.

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, dismantling and reerecting frame bldgs., Alachua Co., to Johnson & Mann, Walgreen Bldg., St. Petersburg, under $100,000. Awarded 9/12.

†**Florida**—U. S. Eng., Courthouse & Customhouse, Mobile, Ala., temporary frame bldgs., water, electric, sewerage sys., Bay Co., to Algernon Blair, 1st Natl. Bank Bldg., Montgomery, Ala., $100,000-$500,000.

†**Florida**—U. S. Eng., Courthouse & Postoffice, Jacksonville, bldgs., appurtenant structures, Polk Co., to John Templin Lumber Co., Lakeland, $100,000-$500,000.

†**Georgia**—U. S. Eng., Postoffice Bldg., Savannah, addnl. bldgs., to Beers Constr. Co., 70 Ellis St. N.E., Atlanta.

★†**Illinois**—Industrial Company, general contract, plant, to Strobel & Hall, 192 Clark St., Chicago. Est. $700,000. Defense Plant Corp. will finance.

★†**Ill., Rosiclare**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, general contract housing units, administration bldg., community facilities, Ill. 11151, to Assets Service Corp., Lombard, $545,000. Bids 8/20. CD 8/28—ENR 9/3.

†**Iowa**—U. S. Eng., Clock Tower Bldg., Rock Island, Ill., remodeling hotel bldgs., to Kucharo Constr. Co., 1901 Easton Blvd., and Union Constr. Co., 711 Old Colony Bldg., both of Des Moines.

★†**Kansas**—U. S. Eng., 10 E. 17 St., Kansas City, Mo., bldg., to Metcalf & Hamilton, Railway Exch. Bldg., and Kansas City Bridge Co., BMA Bldg., Kansas City, Mo. Est. over $3,000,000. CD 9/9—ENR 9/17.

†**Kansas**—U. S. Eng., Wright Bldg., Tulsa, Okla., temporary frame bldgs., Montgomery Co., to D. C. Bass & Sons Constr. Co., Enid, Okla., $100,000-$500,000.

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Chas. H. Tompkins Co., Washington, D. C., 3 Contracts, 906,000 sq. ft.
Wark & Company, Philadelphia, Pa., 4 Contracts, 2,355,000 sq. ft.
Thos. O'Connor & Co., Boston, Mass., 3 Contracts, 810,000 sq. ft.
Wigton-Abbott Corp.—Mahony Troast Construction Co., Bayonne, N. J., 9 Contracts, 1,838,000 sq. ft.
Turner Construction Co., New York City & Philadelphia, Pa., 3 Contracts, 1,305,000 sq. ft.
Rust Engineering Co., Pittsburgh, Pa., 3 Contracts, 1,352,000 sq. ft.
Brann & Stuart Co., Philadelphia, Pa., 3 Contracts, 9,094,000 sq. ft.

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PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†**Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, fire station, Rapides Parish, to H. D. White & Co., 2202 W. 107 Pl., Chicago, Ill., under **$50,000.**

†**Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, temporary frame bldgs., Rapides Parish, to J. M. Brown Constr. Co., 236 Lister St., Shreveport, **$100,000-$500,000.**

★†**Maine**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., permanent frame housing, Me. 17023, to Volpe Constr. Co., 54 Eastern Ave., Malden, Mass., **$1,243,000;** demountable units, Me. 17024, to John Bowen Co., 129 Newbury St., Boston, Mass., **$420,200.** Bids 5/28. CD 6/2—ENR 6/4, under LB.

†**Maine**—U. S. Eng., Park Square Bldg., Boston, Mass., temporary frame bldgs., Inv. 175-43-Neg. 67, to T. W. Cunningham, Inc., 61 State St., Bangor. Est. **$150,000.** Bids 9/12.

†**Maryland**—U. S. Eng., Cumberland, frame bldgs., to G. F. Hazelwood Co., Cumberland. Est. **$100,000.**

†**Maryland**—U. S. Eng., Standard Oil Bldg., Baltimore, service structures, to Consolidated Engr. Co., 20 E. Franklin St., Baltimore.

†**Maryland** — U. S. Eng., Aberdeen, cold storage bldg., to John K. Ruff Co., 100 W. 22 St., Baltimore.

†**Maryland**—U. S. Eng., 1 and Douglas Sts. N.W., Wash., D. C., bldgs., to Modern Movable Homes, Silver Springs.

†**Maryland**—U. S. Eng., Standard Oil Bldg., Baltimore, frame bldgs., to Phillip Cohen, 5318 Beaufort Ave., Baltimore. Est. **$50,000.**

†**Maryland**—Federal Works Agency, F between 18 and 19 Sts., N.W., Wash., D. C., school bldgs., at Middle River, Essex and Chase, to Consolidated Eng. Co., 20 E. Franklin St., Baltimore. James R. Edmunds Jr., Calvert Bldg., Baltimore, archt. for Middle River School, Buckler & Fenhagen, 325 N. Charles St., Baltimore, archts. for Essex and Chase schools.

†**Maryland**—U. S. Eng., Aberdeen, 2 frame assembly plants, to Boyd H. Kline, Bloomsburg, Pa.

†**Massachusetts**—U. S. Eng., Park Square Bldg., Boston, cold storage bldg. addn., Barnstable Co., to Sullivan-Foster, Inc., New Bedford, under **$50,000.**

†**Massachusetts**—U. S. Eng., Park Square Bldg., Boston, housing, to Carilli Constr. Co. and John Basile Co., Inc., 281 Adams St., Dorchester; electrical work, to R. E. Harris Co., 110 Avon St., Malden.

★†**Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, prefabricated steel bldgs., electrical and heating sys., Wayne Co., to Paul M. Sterling, 114 Liberty St., New York, N. Y., under **$1,000,000.**

★†**Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, brick, steel, concrete factory, to The Austin Co., 16110 Euclid Ave., Cleveland, O. Est. under **$1,000,000.**

†**Mississippi**—U. S. Eng., Postoffice & Courthouse, Vicksburg, temporary frame bldgs., Washington Co., to Gulfcoast Constr. Co., Inc., Hattiesburg. **$100,000-$500,000.**

†**Missouri**—U. S. Eng., 800 Courthouse & Customhouse, St. Louis, bldgs., to Sol Abrahams & Son Constr. Co., Title Guaranty Bldg., St. Louis. Est. **$100,000-$500,000.**

★†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, temporary frame bldgs., electric, water, sewerage sys., Box Butte Co., to Olson, Assenmacher & Rokahr, Lincoln, **$500,000-$1,000,000.**

★†**Nebraska**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., temporary frame bldgs., water, electric and sewerage sys., Thayer Co., to Peter Kiewit & Sons Co., and G. W. Condon Co., 1024 Omaha Natl. Bank Bldg., Omaha, **$500,000-$1,000,000.**

★†**Nebraska**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., temporary frame bldgs., Clay Co., to Peter Kiewit & Sons Co., and Geo. W. Condon Co., 1024 Omaha Natl. Bank Bldg., Omaha, **$1,000,000-$5,000,000.**

★†**Nebraska**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., temporary frame bldgs., water, electric and sewerage sys., Fillmore Co., to Peter Kiewit & Sons Co., and Geo. W. Condon, 1024 Omaha Natl. Bank Bldg., Omaha, **$500,000-$1,000,000.**

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, temporary frame bldgs., Scottsbluff Co., to Spiegelberg Lumber & Building Co., Laramie, Wyo. **$100,000-$500,000.**

★†**New Jersey**—U. S. Eng., Penn-Mutual Bldg., Phila., Pa., bldgs., to John A. Johnson & Sons, 270 41 St., Brooklyn, N. Y., and Andrew Christensen, 1140 E. Jersey St., Elizabeth, over **$5,000,000.**

★†**New Jersey**—U. S. Eng., 6 and Walnut Sts., Phila., Pa., bldgs., to Wm. Linker Co., Inc., 2036 Arch St., Phila., Pa., **$1,000,000-$5,000,000.** CD 9/2—ENR 9/10.

†**New Mexico**—U. S. Eng., Albuquerque, roads and railroad grading, McKinley Co., to Denison & Shotwell, Albuquerque, **$50,000-$100,000;** sewage, electric and water sys., McKinley Co., to F. D. Shan[illegible] querque, **$50,000-$100,000.**

†**New Mexico** — U. S. Eng. storage bldg., to Kelly Cop[illegible] Bldg., Fort Worth, Tex., und[illegible],000.

†**New York**—U. S. Eng., 120 York, concrete, steel bldgs. Equity Constr. Co., 25 W 43 **$100,000-$500,000.**

†**North Carolina**—U. S. Eng bldgs., to W. H. Hand & Son,

†**North Carolina**—U. S. Eng bldgs., to Dixon Constr. Co. Bids 9/15.

†**North Carolina**—U. S. Eng & Court House Bldg., Norfolk, bi Loving & Co., Goldsboro.

★†**North Carolina**—U. S. Eng. house, Wilmington, temporary sewage, electric and water sys fencing, New Hanover Co., to T. Co., Goldsboro, **$500,000-$1,000,000.**

†**Ohio**—Johnston & Hennings Davis, pres., 877 Addison Rd., Cle sign and construction, shredding plant, to H. K. Ferguson, Hanna land. **$100,000.** Defense Plant finance.

★†**Ohio**—Industrial Company, bldgs., railroads, sewers, waterworks utilities to Holmes Constr. Co., 443 Palmer St. Wooster. Est. **$20,000,000.** Defense Plant Corp. will finance. CD 7/10—ENR 7/16.

†**Ohio**—U. S. Eng., U. S. Post Office & Courthouse, Cincinnati, reroofing bldgs., to Warren-Ehret Co., 7635 Thomas Blvd., Pittsburgh. **$100,000-$500,000.**

†**Ohio**—U. S. Eng., Wright Field, Dayton, storage bldg., to Edward T. Honnert & Sons, Colerain St., near Van Zandt St., Cincinnati, under **$50,000.**

†**Pennsylvania**—U. S. Eng., Standard Oil Bldg., Baltimore, Md., warehouses, Lebanon Co., to Ritter Bros., 1511 Commerce St., Harrisburg, **$100,000-$500,000.**

†**Rhode Island**—U. S. Eng., 819 Industrial Trust Bldg., Providence, housing, to E. Turgeon, 614 Turks Head Bldg., Providence. Est. over **$150,000.** Bids 9/12.

★†**South Carolina**—U. S. Eng., 33 Custom house, Charleston, temporary frame bldgs., clearing, grading, paving, Charleston Co., to V. P. Loftis Co., Builders Bldg., Charlotte, N. C. **$1,000,000-$5,000,000.**

†**Tennessee**—U. S. Eng., 306 U. S. Court house, Nashville, temporary frame bldgs., Coffee Co., to Gardner Constr. Co., McGavock Lane, Nashville, **$100,000-$500,000.**

†**Texas**—U. S. Eng., Fort Sam Houston bldgs., part C, Spec. 42-113, to B. W. Steen Co., 1st Natl. Bank Bldg., Houston, **$100,000-$500,000.**

†**Texas**—U. S. Eng., 25 St. and Avenue F Galveston, bldgs., to Dallas Engine Eng. Co., 2100 S. Akard St., Dallas, **$100,000-$500,000.**

†**Texas**—U. S. Eng., 25 St. and Avenue F Galveston, temporary frame bldgs., Galveston Co., to Brown Constr. Co., Greenwood St., Houston, **$100,000-$500,000.**

†**Texas**—U. S. Eng., 25 St. and Avenue F Galveston, storage bldg., to A. G. Johnson Guaranty Bldg., Galveston, under **$50,000.** CD 6/4—ENR 6/11.

†**Texas**—U. S. Eng., San Antonio, temporary frame bldgs., Bell Co., to R. D. Jones Constr. Co., Dallas, **$100,000-$500,000.**

Wis., Biron (Wisconsin Rapids P. O.)—School Bd. Dist. 1, Wisconsin Rapids, general contract rebuilding school, to A. F. Billmeyer & Son, Wisconsin Rapids; electrical contract, to Staub Electric Co., Wisconsin Rapids.

Wis., Randolph—Bd. Educ., general contract 1 and 2 story, part basement, 89x145 ft school and auditorium, to Leo Schoenrock, New London; electrical contract, to Varis Electric Shop, Randolph. Bids 5/16. CD 5/5—ENR 5/7.

British Columbia—Dpt. National Defense for Air, Ottawa, Ont., addnl. temporary accommodations, incl. barracks, mess and drill halls, administration bldg., officers' quarters, etc., to Maxwell Constr. Co. Ltd., 540 Howe St., Vancouver, **$262,000.**

B. C., Vancouver—Dpt. Natl. Defense for Air, officers quarters, barracks, mess and drill hall, E. F. T. School, to A. Sullivan, 736 Granville St., Vancouver, **$376,000.**

Man., MacDonald—Dpt. National Defense, Ottawa, Ont., addnl. accommodation, barracks, mess halls, officers quarters, etc., at Bombing and Gunnery School 3, to Manitoba Eng. Co. Ltd., 204 Lombard Bldg., Winnipeg, about **$250,000.** CD 8/4—ENR 8/6.

Ont., Toronto—Dpt. National Defense, Ottawa, Ont., 2 addnl. storage bldgs., at No. 1 Equip. Depot, Yonge and Fleet Sts., to Carter-Halls-Aldinger Co., Ltd., 419 Cherry St., about **$200,000.**

PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

Que., Montreal—Dominion Govt., Ottawa, Ont., 70x1[illegible] ft. concrete boiler house, 45 ft. high, reinforced con. fdn., to A. Janin & Co., Ltd., 1460 W. Sherbrooke St. Est. **$60,000.** Dpt. National Defense, Ottawa, Ont., archts. Dpt. Munitions & Supply, Ottawa, Ont., engrs.

Que., Montreal—Dpt. Natl. Defense, Ottawa, Ont., storage depot, to Kennedy Constr. Co., Ltd., 407 McGill St., Montreal, about **$250,000.**

Que., Valleyfield—Dominion Govt., Ottawa, Ont., 12 frame bldgs., concrete fdns., to F. Ross, 5540 Woodbury St., Montreal. Est. **$150,000.** Dpt. National Defense, Ottawa, Ont., archt. Dpt. Munitions & Supply, Ottawa, Ont., engrs.

COMMERCIAL BUILDINGS

★ **Calif., Stockton**—J. J. Mangusto, 135 N. California St., plans by W. Mooser, Jr., 481 Monadnock Bldg., San Francisco, one hundred forty 1 story frame residences. $560,000.

★ **Me., South Portland (br. Portland)**—Cumberland Corp., Cape Elizabeth, 500 frame units. $1,750,000.

Mo., St. Louis — Bd. Trustees Washington University, 517 S. Euclid Ave., plans by Jamieson & Spearl, 1696 Arcade Bldg., completion of 5 unfinished floors in 14 story, bsmnt. McMillan Hospital, 517 S. Euclid Ave. $241,000. **Applied for federal gr.**

★ **N. J., Clifton**—Colonial Gardens, Inc., 626 Central Ave., East Orange, plans by Isadore Naftali, 900 Bergen Ave., Jersey City, 2½ story, bsmnt., brick, concrete, garden type apartment. $700,000.

N. J., Union—Morris Av. Holding Co., 960 Stuyvesant Ave., c/o McMurray & Schmidlin, archts., 960 Stuyvesant Ave., 6 unit, 2 story, bsmnt., brick veneer, garden apartment, incl. 30 garages. **$274,000.**

N. Y., Jamestown — Women's Christian Assn. Hospital, M. Hokanson, supt., Foote Ave., 2 story, bsmnt., brick, steel, concrete hospital addn. $150,000.

O., Canton—T. K. Harris Agency, headed by T. K. Harris, Clark Bldg., converting 3 story, two wing Dueber-Hampden watch factory into Hampden Park Hotel. $150,000.

O., Cleveland—C. & R. Investment Co., I. B. Rabb, 10110 Westchester Ave., 37 frame houses. $200,000.

S. C., Charleston—Princess Guido Pignatelli, Wanda Plantation, R.F.D., Charleston, rebuilding 2½ story residence, near here. $200,000.

B. C., Kimberley—Consolidated Mining & Smelting Co., Ltd., Trail, 1½ story, 22 ft. square frame dwellings, concrete fdns. $150,000.

BIDS ASKED

Bids Asked October 1

Ind., Anderson — E. F. Miller, archt., 514 Anderson Bank Bldg., completing interior 8 story, brick Anderson Hotel, for Albert Pick Co., Inc., 2159 W. Pershing St., Chicago, Ill. $150,000.

CONTRACTS AWARDED

Calif., Hayward—Groom & Groom, Inc., Lewellen Rd. and E. 14 St., one hundred twenty 1 story, frame residences, Lewellen Rd. and E. 14 St., 1 mi. north of here. Owner builds. **$420,000.**

Calif., Richmond—Idemore Co., Inc., C. A. Griffin & M. Gallos, c/o Richmond Realty Co., 25 and Macdonald Ave., ten 4 unit apartment bldgs., to George Tandy and Grover Carpenter, 1212 20 St. Est. **$150,000.** P. H. Hammarberg, 2 Norwood Ave., Berkeley, archt.

Calif., San Leandro—Standard Homes, Inc., 1 E. 14 St., 1 story, 5 room residences, to Seward Pearson, 1 E. 14 St. Est. over **$150,000.**

★ **Calif., Van Nuys**—Tailored Homes Building Co., 6700 Coldwater Canyon Ave., North Hollywood, 206 frame, stucco dwellings. Owner builds. **$700,000.**

Mass., Malden—Hazelwood Realty Trust, c/o K. V. Wolsey, 200 West St., Hyde Park, thirty-three 2 story 22x70 ft. and 22x80 ft. frame dwellings. Old Converse Estate. Owner builds. **$330,000.**

Mass., Saugus—Arlington Homes, Inc., 38 Chauncel St., Boston, thirty 1 story, 25x36 ft. frame houses, Central St. Owner builds. **$156,000.**

★ **N. J., North Bergen**—Homes for Defense, Inc., 125 E. 170 St., New York, N. Y., one hundred four 2 story bsmnt., brick, frame trim houses, to Rice Constr. Co., 135-35 Northern Blvd., Flushing, N. Y., **$650,000.** Geo. L. Swiller, 148 Ayers Court, Teaneck, archt.

O., Columbus—Linden Park Homes, 42 E. Gay St., 32 frame single dwellings, Loretta Ave. and Kenwood Pl., to L. M. Leonard,

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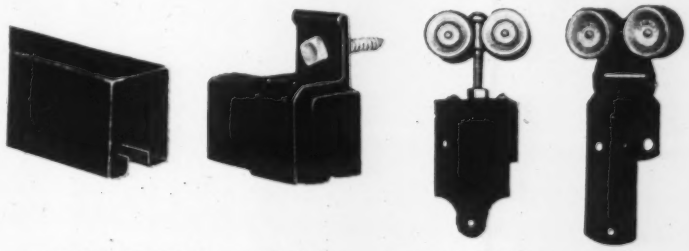

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COMMERCIAL BLDGS. (Contracts Awarded. Cont'd.)

42 E. Gay St., $154,000. Est. $150,000. Awarded 9/10.

Okla., Pryor—Daniel Addition Co., Pryor, S. P. Daniel, pres., 108 brick veneer detached bldgs., owner builds, hire labor. **$400,000.** H. Grubbs, Pryor, supt. construction.

Pennsylvania — Hillman Coal & Coke Co., W. L. Affelder, vice pres. and chg. oper. and proj., Grant Bldg., Pittsburgh, 20 (ultimately 120) one story, 22x23 ft., frame prefabricated houses, various locations, Greene Co., to Travelodge, Inc., 1120 Madison St., Lynchburg, Va. Est. **$300,000.**

Pa., Beaver Falls—Brown & Vaughn Development Co., J. H. Brown, in charge, 1614 7 Ave., 32 one and one-half story, bsmnt., 24 x 26 ft. residences, separate contracts. **$160,000.**

Pa., Grove City — Book-Davis Co., Grove City, 20 frame dwellings, garages, Sunset and Columbia Aves. Owner builds. Est. **$150,000.**

Pa., Pottstown — Community Homes, Inc., Pottstown, forty-two 2 story brick homes, to John C. Dethoff, Reading, over **$200,000.**

Pa., Wilkinsburg—J. Bensmiller, Mt. Royal Blvd., Etna, 27 two story, 20x27 ft., brick veneer residences, Penn Twp., near here, separate contracts. **$162,000.**

R. I., Newport—New England Telephone & Telegraph Co., 245 State St., Boston, Mass., 2 story, bsmnt., 125x130 ft. brick, steel exchange bldg., to Carey Constr. Co., 50 N. Main St., Fall River, Mass. Est. **$175,000.** Bids 9/15. CD 9/9.

Tex., Bastrop—ACA Houstin Co., c/o Ash-Crow-Allbright, Bastrop, 75 frame dwellings, force account, approx. **$225,000.** CD 8/3—ENR 8/10.

Tex., Marshall — Pinecrest Housing, Inc., Marshall, 111 frame type dwellings, force account. **$400,000.** CD 9/10—ENR 9/17.

Tex., Texas City—Gordy Bros., Texas City, 50 frame dwellings. Owner builds. **$280,000.** CD 9/1—ENR 9/3.

INDUSTRIAL BUILDINGS

PROPOSED WORK

California — PLANT — Industrial Company, soon lets contract, bldg. Over $40,000. Donald B. Parkinson, 433 S. Spring St., Los Angeles, archt.

California—FACTORY—Day & Night Mfg. Co., Monrovia, 15 frame bldgs., 40 acre site, Los Angeles Co. Over $40,000. H. A. Hamm, 579 N. Holiston Ave., Pasadena, engr.

Calif., Bakersfield—MILL—England Lumber Co., Edison Hy., rebuilding mill, destroyed by fire. $150,000.

Calif., Redding — POWER HOUSE — Pacific Gas & Electric Co., 245 Market St., San Francisco, soon lets contract, club house at Pit 5 Power House.

Calif., Rockport — SAWMILL — Cotteneva Redwood Co., Rockport, rebuilding sawmill. $300,000.

Mass., Hingham — PLANT — Air Reduction Sales Co., 60 E. 42 St., New York, N. Y., soon lets contract 2 story, brick acetylene plant. $40,000.

O., Cleveland—FACTORY—National Metal Abrasive Co., H. Marette, secy., 3560 Norton Rd., 1 story, brick factory addn. $50,000.

O., Euclid (br. Cleveland)—FACTORY, etc. —Cleveland Tractor Co., W. King White, pres., E. 199 St. and Euclid Ave., Cleveland, 1 story, 40x144 ft. factory, school and office bldg. $40,000. George S. Rider Co., 3800 Terminal Tower, Cleveland, engrs.

Pa., Phila—PLANT—Philco Corp. Co., Tioga and C Sts., 50x102 ft. plant, C and Ontario Sts. M. Ward Easly, 1201 Chestnut St., engr.

W. Va., Charleston—FACTORY—Federal Foundry & Supply Co., 4500 E. 71 St., Cleveland, O., 1 and 2 story, 60x190 ft. factory, 20x40 ft. warehouse, 14x30 ft. office. $65,000. H. M. Morse Co., 1500 E. Superior Ave., Cleveland, O., engr.

LOW BIDDERS

California—WAREHOUSE—Industrial Company, Sept. 9, warehouse, from L. C. Anderson, 517 Bway. Bldg., San Diego. **$63,500.** Taylor & Taylor, 803 W. 3 St., Los Angeles, archt.

CONTRACTS AWARDED

Calif., Antioch—METER STATION—Pacific Gas & Electric Co., 245 Market St., San Francisco, meter station, to Carrico & Gautier, 365 Ocean Ave., San Francisco.

Massachusetts — WAREHOUSE and GARAGE—Industrial Company, general contract warehouse and garage, to Chandler Constr. Co., Inc., 45 Newbury St., Boston; electrical contract, to J. & M. Brown Electric Co., Inc., 737 Center St., Jamaica Plain. Est. **$40,000.** CD 8/21—ENR **8/27.**

Mass., Springfield—PLANT—[illegible] Corp., 3664 Main St., 82x90 ft. [illegible] addn., etc., Main St., to E. [illegible] 1694 Main St. Est. **$70,000.** [illegible]rican Boxe[illegible] [illegible]con. plant [illegible]rlson, Inc.

Mass., Quincy—RUST FU[illegible] hem Steel Co., E. Howard S[illegible] furnace unit, brick, to Chan[illegible] Inc., 45 Newbury St., Boston. Bids 9/1. CD 8/31—ENR 9/3 [illegible]E—Bethle[illegible] story rust Constr. Co. st. **$40,000.**

Mass., Worcester—SHOP, [illegible] Gordon Co., 105 Madison St., [illegible] ft. and 1 story, 80x100 ft., bri[illegible] office and warehouse, to E. J. [illegible] Prescott St.; electrical work [illegible] Electric Co., 41 Central St. Bids 9/8. CD 9/1—ENR 9/3. —Wyman[illegible] ory, 55x120 steel shop, [illegible]s Co., 159 Scrimgeour **$200,000.**

Minn., Minneapolis — FACTO[illegible] Machinery & Mfg. Co., 1331 N[illegible] factory addn., to Dean L. [illegible] Builders Exch. Bldg. Est. **$40,000.** —Electric Tyler St. [illegible]cher, 544 incl. equip.

Mo., St. Louis—PLANT—Pevely Dairy Co., 1001 S. Grand Blvd., 1 story, 36x119 ft. milk plant addn., brick, to George M[illegible]er Constr. Co., 3007 Wyoming St. Est. $40,000 incl. equip.

Neb., Omaha—COLD STORAGE PLANT—Jerpe Commission Co., 12 and Douglas Sts., cold storage plant, to John Lof & Sons, 4012 Lake St. Est. **$100,000.** CD 8/13/41—ENR 8/21/41.

N. J., Port Reading—SHED—Reading Co., Reading Terminal 12 and Market Sts., Phila., alterations, addns. thawing shed, to Calabro Constr. Co., 5274 4 Ave., Elizabeth, **$40,000**; electrical work, to J. Tomasulo & Co., 331 Westfield Ave., Roselle Park.

O., Cleveland — FACTORY, etc. — Linderme Tube Co., E. Linderme, pres., 1500 E. 219 St., 60x100 ft. brick, steel factory and office addn., 3 ton overhead crane, to H. E. Kiefman Co., 3436 Lorain Ave. Est. **$40,000.** E. G. Hoefler, 5005 Euclid Ave., engr.

O., Cleveland — FACTORY — Maurath Co., G. H. Maurath, pres., 7309 Union Ave., 1 story, 98x260 ft., 15x400 ft., 20x20 ft., 20x40 ft., and 40x80 ft., and 2 story, 50x750 ft. and 40x80 ft. brick, timber factory bldgs., to E. J. Benes & Co., Terminal Tower; electrical work, to Parker Electric Co., 4502 Prospect Ave. Total est. **$100,000.**

Pa., Monaca—PLANT—Superior Steel Products Co., M. P. Simpson, purch. agt., 14 St., 1 story, 60x300 ft. also 1 story, 120x300 ft. and 1 story, 100x120 ft., brick, steel and concrete addns., to John J. Brooks & Son, 2538 8 Ave., Beaver Falls. Est. between **$100,000** and **$500,000.**

Pa., Neville Island (br. Pittsburgh)—FACTORY—Vulcan Detinning Co., E. S. Dewey, plant supt., Neville Island, 1 story, 50x300 ft., steel frame, metal siding factory addn., to Pittsburgh Des Moines Steel Co., Neville Island, Pittsburgh.

Pa., Pittsburgh—PLANT—Mine Safety Appliance Co., J. F. Beggs, vice pres. and secy., 300 N. Braddock Ave., general contract 2 story, brick mfg. bldg. addn., interior alterations 3 story, brick, etc., to Navarro Corp., 6219 Broad Ct. Prack & Prack, 517 Martin Bldg., archts.

Pa., Ridgeway—SHOP—Elliott Co., 4 Ave., Jeannette, 1 story, 70x100 ft. brick, steel concrete Shop Bldg., 2 addn., to Berkebile Bros., 625 Swank Bldg., Johnstown. CD 9/9—ENR 9/17.

S. D., Yankton—PLANT—Yankton Industrial Alcohol Co., Yankton, converting brewery into alcohol plant, to F. H. Jones, Yankton. Est. **$40,000,** incl. equip.

Texas—PLANT—Globe Aircraft Corp., Fort Worth, altering bldgs. into plant, etc., force account. **$175,000.** W. C. Hedrick, 1005 1st Natl. Bank Bldg., Fort Worth, archt. and engr.

Tex., Decatur—PLANT—Texas Chemurgic Industries, Inc., c/o W. C. Witt, Decatur, replacing dehydration plant. Purchase and Hire and sub-contract. Approx. **$45,000.** CD 9/2—ENR 9/10.

Tex., Mercedes—PACKING PLANT—Missouri Pacific Ry., F. E. Bates, ch. engr., Missouri Pacific Bldg., St. Louis, Mo., citrus and vegetable packing plant, facilities. Owner builds. **$40,000.** Watson Co., lessee. CD 8/27—ENR 9/3.

Wis., Belgium—WAREHOUSE—Krier Preserving Co., Belgium, 1 story, 40x100 ft. frame warehouse, concrete fdn., to L. Decker, Belgium. E. A. Stubenrauch, 708 Erie Ave., Sheboygan, archt.

Wis., Eau Claire — PLANT — Drummond Packing Co., Galloway St., 1 story, 40x90 ft. top addn. also altering 2 story, brick plant, to Hoeppner-Bartlett Co., 631 E. Madison St.; heating, to Bartingale Co., Eau Claire. CD 2/25—ENR 3/5.

Wis., Green Bay — WAREHOUSE — Leicht Transfer & Storage Co., 121 S. Bway., 1 story, 50x150 ft. frame warehouse, concrete fdn., to Selmer Co., Northern Bldg. H. W. Williams, Northern Bldg., archt.

★ **Que., Granby**—PLANT—Miner Rubber Co., Ltd., 191 Denison St., plant addn., to G. L. Guay & Freres, Ltd., 437 Guy St., Montreal, about **$500,000.**

Wat